The RUBBER AGE

December, 1941

THE ULTRA ACCELERATORS

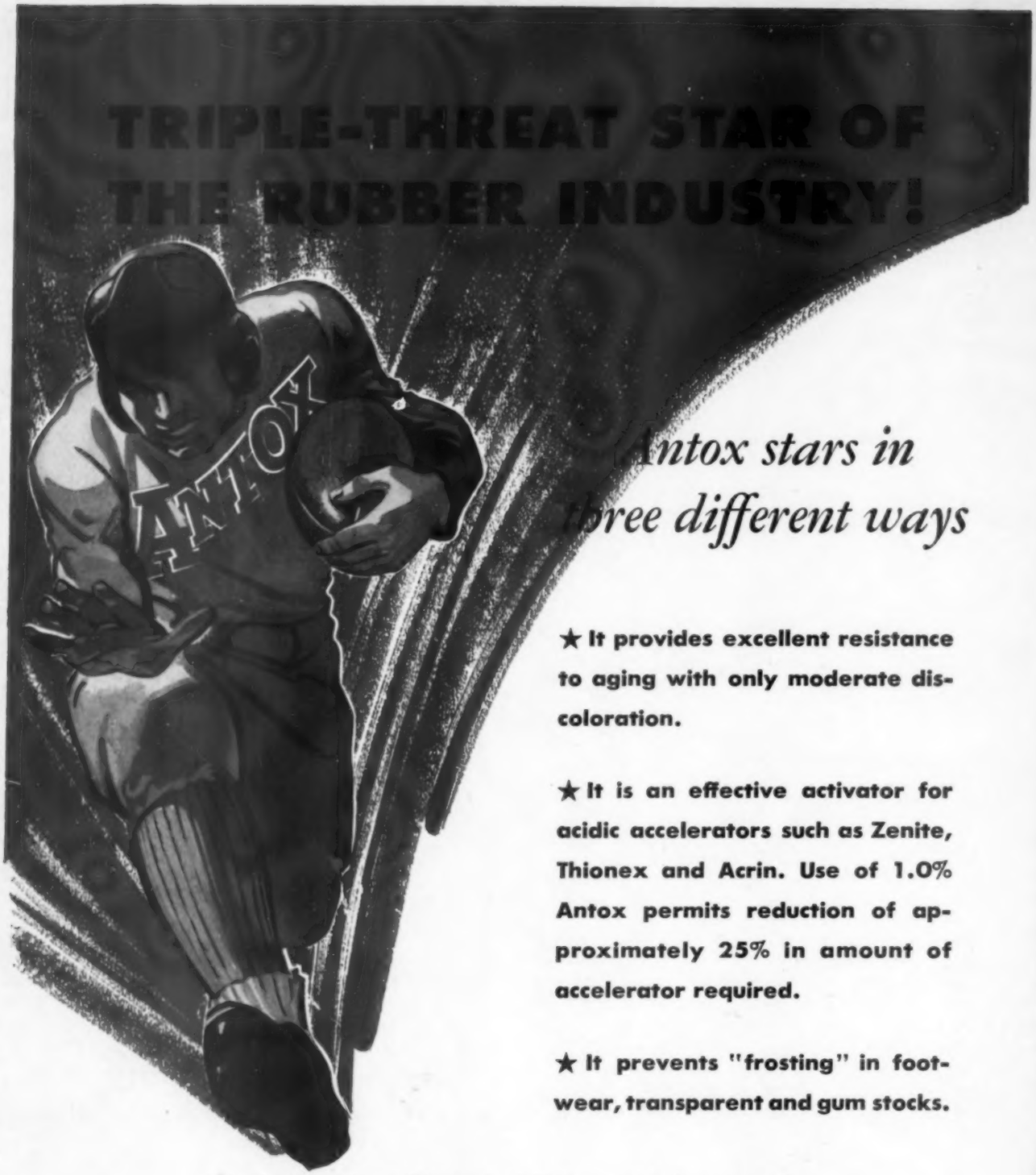
THIURAMS
and
DI-THIO-CARBAMATES
are
PLENTIFUL and CHEAPER

Their use both alone and also along with CAPTAX and ALTAX is growing rapidly.

For "UP TO THE MINUTE COMPOUNDING WITH ULTRA ACCELERATORS"—See Vol. 11—No. 5 of the Vanderbilt News.

R. T. VANDERBILT CO., Inc.
230 Park Avenue, New York City

R·T·VANDERBILT CO·INC·
AMERICAN PRODUCTS



Antox stars in three different ways

★ **It provides excellent resistance to aging with only moderate discoloration.**

★ **It is an effective activator for acidic accelerators such as Zenite, Thionex and Acrin. Use of 1.0% Antox permits reduction of approximately 25% in amount of accelerator required.**

★ **It prevents "frosting" in footwear, transparent and gum stocks.**

Ask the Du Pont Technical Representative or write:

DU PONT

REG. U.S. PAT. OFF.

RUBBER CHEMICALS DIVISION

E. I. DU PONT DE NEMOURS & CO. (INC.), WILMINGTON, DELAWARE

THE RUBBER AGE, published monthly by The Palmerton Publishing Co., Inc., Printing Office, East Stroudsburg, Pa. Editorial and Advertising Offices at 250 West 57th Street, New York, N. Y. Entered as second class matter October 20, 1933, at the Post Office at East Stroudsburg, Pa., under the Act of March 3, 1879. Subscription in United States, $3.00 a year. Canada, $3.50; Foreign, $4.00. December, 1941. Vol. 50, No. 3.

LATEX 40% LATEX 60% REVERTEX 73%-75% ALL LATEX COMPOUNDS

REVERTEX IS A REGISTERED TRADEMARK OF THE GOODYEAR TIRE & RUBBER COMPANY

REVERTEX CORPORATION OF AMERICA

AGENTS:

CALIFORNIA: Edmund C. Jens, 108 West 6th Street, Los Angeles, Cal.

DETROIT: Henry C. Morris & Brothers 10216 General Motors Building

CANADA: Chemicals Limited, 380 St. Paul Street West, Montreal, P.Q.

AKRON: J. A. Kendall, 714 Second National Building

CHICAGO OFFICE: Mercantile Building, 53 West Jackson Boulevard

OUR TECHNICAL SERVICE DEPARTMENT IS AT YOUR DISPOSAL WITHOUT CHARGE OR OBLIGATION

MAIN OFFICE

37-08 NORTHERN BOULEVARD LONG ISLAND CITY, NEW YORK

CLIMCO PROCESSED LINERS

The Accepted Standard of Quality for the Rubber Industry

ENTHUSIASTICALLY received 19 years ago, Climco Processed Liners are today preferred throughout the industry.

Now that defense conditions demand more and faster production, the advantages of Climco Processed Liners are of even greater importance. For Climco Processing insures better separation, greatly increases the life of the liner and eliminates stock adhesions. With Climco Processed Liners on the job, production at the cutting table flows smoothly and without interruption.

A trial of Climco Processed Liners will soon demonstrate to you their superior quality and greater durability—and explain why most leading companies have standardized on Climco.

★ ★ ★

THE CLEVELAND LINER & MFG. CO.
CLEVELAND, OHIO

Keystone View Co.

WATERPROOF FOOTWEAR COMFORT Enhanced by GASTEX and PELLETEX

No GASTEX in these shoes, picturesque but—?

It is often said that the luxuries of yesterday have become the necessities of today. The fact that some few always retain the provincial customs of the past keeps us from taking for granted the great advantages we enjoy over the poorer enrichments of our grandparents.

The light-weight comfort and extreme serviceability of modern rubber overshoes, the live-bouyance of rubber heels and the rugged utility of rubber soled sport shoes need no sponsors in proving their superiority over the heavy, cumbersome footwear of the low countries.

In this welcome development, the special process blacks GASTEX and PELLETEX have played no small part. These popular pigments have been found ideal by technicians in achieving style, pliancy and long wear without excessive weight. GASTEX and PELLETEX footwear compounds produce overshoes, boots, soles and heels remarkable for their flexibility, resilience, aging properties and freedom from cracking.

Technical bulletins on the subject will be sent on request made on firm's letterhead.

GENERAL ATLAS CARBON DIVISION

OF GENERAL PROPERTIES COMPANY, INC.

GASTEX

SIXTY WALL STREET, NEW YORK, N. Y.

PELLETEX

Plants: Pampa, Tex.; Guymon, Okla.

SALES REPRESENTATIVES

ERNEST JACOBY & CO.
Boston

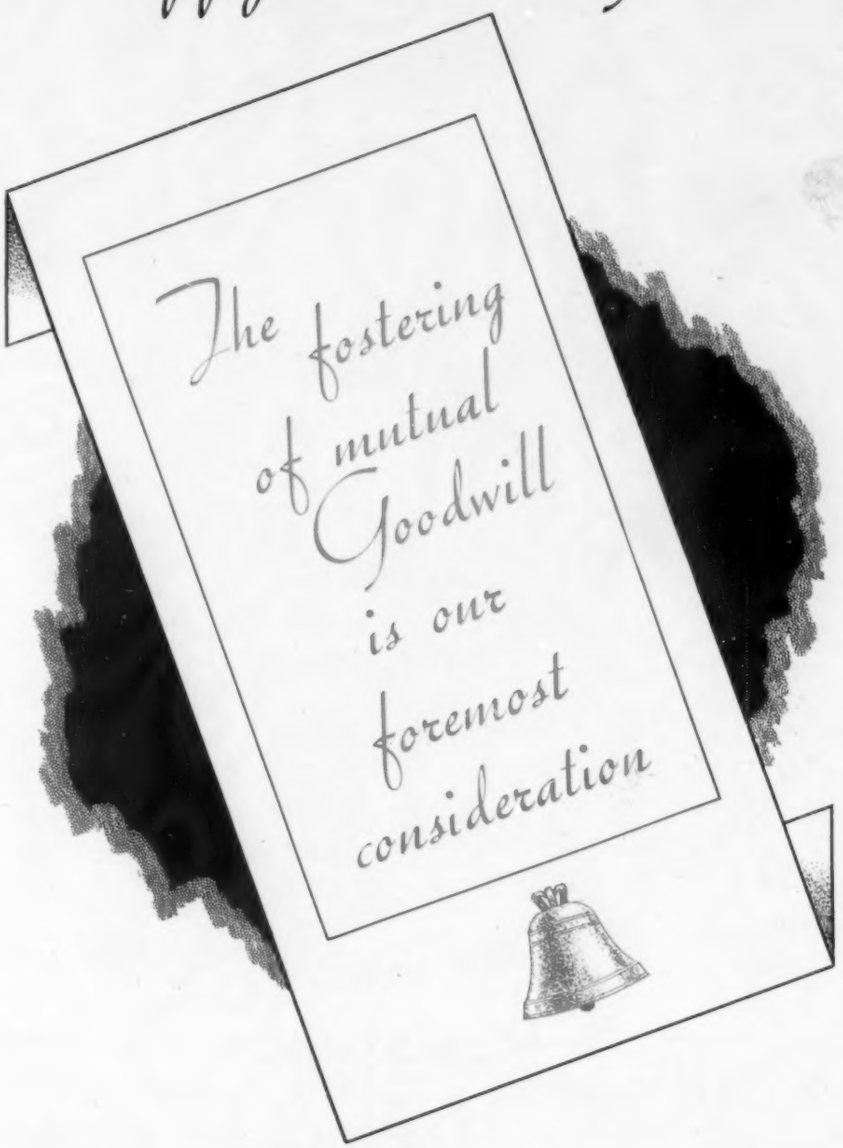
THE C. P. HALL CO. OF CALIF.
Los Angeles

HERRON & MEYER
Akron • New York • Chicago

H. M. ROYAL, INC.
Trenton, N. J.

ST. LAWRENCE CHEMICAL CO., LTD.
Toronto • Montreal

Happy New Year!



H. Muehlstein & Company

INCORPORATED

122 E. 42nd STREET NEW YORK, N. Y.

for **INSULATED WIRE**

Tensile strength

Resistance to aging

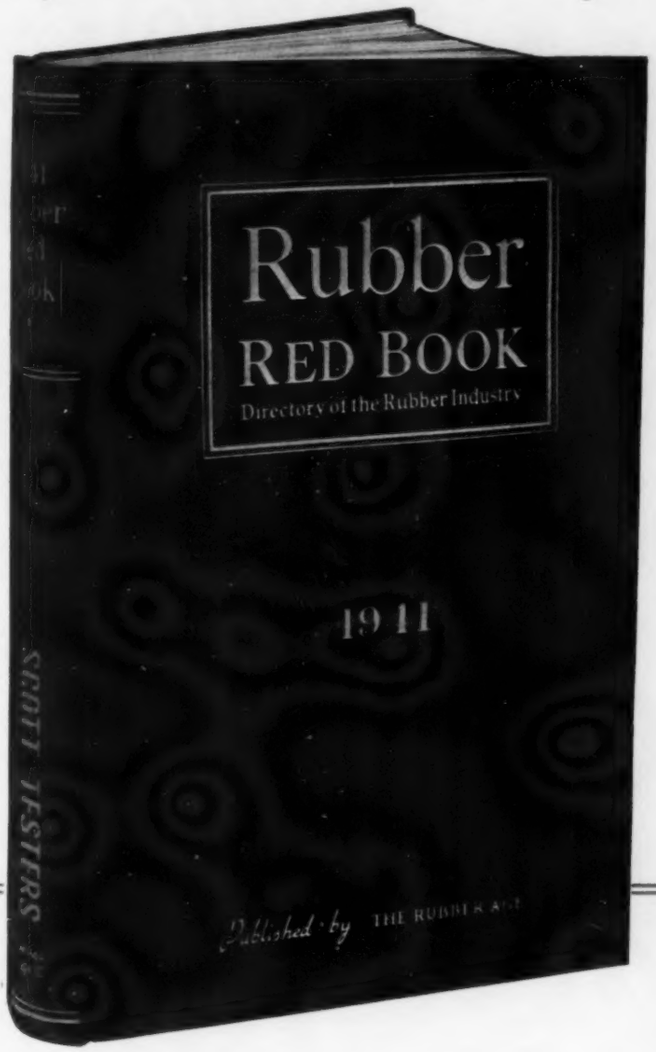
Dielectric strength

Write Our Technical Service Dept. for Details.

MOORE & MUNGER

33 RECTOR STREET - NEW YORK CITY

Answers Your Questions on Every Phase of the Rubber Industry



514 Pages
6 x 9 inches
Cloth Bound

Price
$5.00
Postpaid

The Enlarged 1941 Rubber Red Book

- **Completely revised with all data brought strictly up-to-date**
- **Several new sections added based on the needs of the industry and at the suggestions of users**
- **Fully indexed for easy reference, making the location of any material a simple matter**
- **New cover of latex-bonded fibre with leather finish which will withstand constant handling**
- **Contains information and data not available elsewhere (see Table of Contents on reverse side)**

Send for your copy today
—Use coupon on reverse side

•

Published by

THE RUBBER AGE
250 West 57th Street
New York, N. Y.

The INDISPENSABLE REFERENCE BOOK for Rubber Manufacturers, Suppliers, etc....

To rubber factory executives, purchasing agents, technologists, etc., the RUBBER RED BOOK furnishes complete and handy lists of suppliers of all kinds of materials, equipment and services classified for easy reference. This is a service which saves buyers much time and effort as in no other directory are such lists available.

Suppliers and their salesmen, on the other hand, find the RUBBER RED BOOK invaluable for its complete and accurate listing of rubber manufacturers in the United States and Canada with such data as size of company, type of products made, names of buyers and other executives, etc. Also included is a geographical breakdown of rubber manufacturers in the United States showing all companies in each city and town. This feature enables salesmen to be certain that no prospect is overlooked.

No matter what position you hold in the rubber industry—factory executive, purchasing agent, chemist, technologist; supplier of machinery, chemicals, rubber, or other materials; librarian; consultant; salesman or user of rubber products—you should have a personal copy of the 1941 RUBBER RED BOOK on your desk or in your brief case ready to give an immediate answer to the thousand and one questions which crop up constantly, particularly during these critical days when accurate information is so essential.

Summary of Contents 1941 RUBBER RED BOOK

RUBBER MANUFACTURERS IN THE UNITED STATES
Alphabetical Section; Classified List of Rubber Products; Geographical Section.

RUBBER MANUFACTURERS IN CANADA

RUBBER MACHINERY AND EQUIPMENT
Classified List of Machinery; Machinery Manufacturers and Addresses

ACCESSORIES AND FITTINGS
Classified Lists of Products; Suppliers and Addresses

RUBBER CHEMICALS AND COMPOUNDING MATERIALS
Classified List of Materials; Trade and Brand Names; Suppliers and Addresses

FABRICS AND TEXTILES
Classified List of Materials; Suppliers and Addresses

CRUDE RUBBER AND RELATED MATERIALS
Classified List; Suppliers and Addresses

SYNTHETIC RUBBER AND OTHER RUBBER-LIKE MATERIALS

RECLAIMED RUBBER
Manufacturers and Addresses; Methods of Manufacture; Statistics (1919-1940)

SCRAP RUBBER DEALERS

RUBBER DERIVATIVES

RUBBER LATEX
Latex and Latex Compounds; Water Dispersions; Special Latex Processes; Latex Compounding Materials; Latex Machinery and Equipment

MISCELLANEOUS PRODUCTS AND SERVICES
Backing for Camelback; Cork Products, Wax Crayons; Decalcomania Transfers; Scrap Rubber Grinding; Inks for Printing on Rubber; Rubber Labels; Master Batches; Liner Compounds; Liners Processed; Processed Liners; Processed Paper

CONSULTING TECHNOLOGISTS

MANUFACTURER'S SALES AGENTS, BRANCH OFFICES, ETC.
In the United States; In Canada

TECHNICAL JOURNALS

TRADE AND TECHNICAL ORGANIZATIONS

WHO'S WHO IN THE RUBBER INDUSTRY

SUBJECT INDEX

USE THE ATTACHED CONVENIENT ORDER FORM

..... 19.....

THE RUBBER AGE
250 West 57th St., New York

Kindly send ..... copies of the 1941 RUBBER RED BOOK at $..... each to the undersigned:

Remittance Herewith ☐

Send Invoice ☐

NAME _____

ADDRESS _____

_____

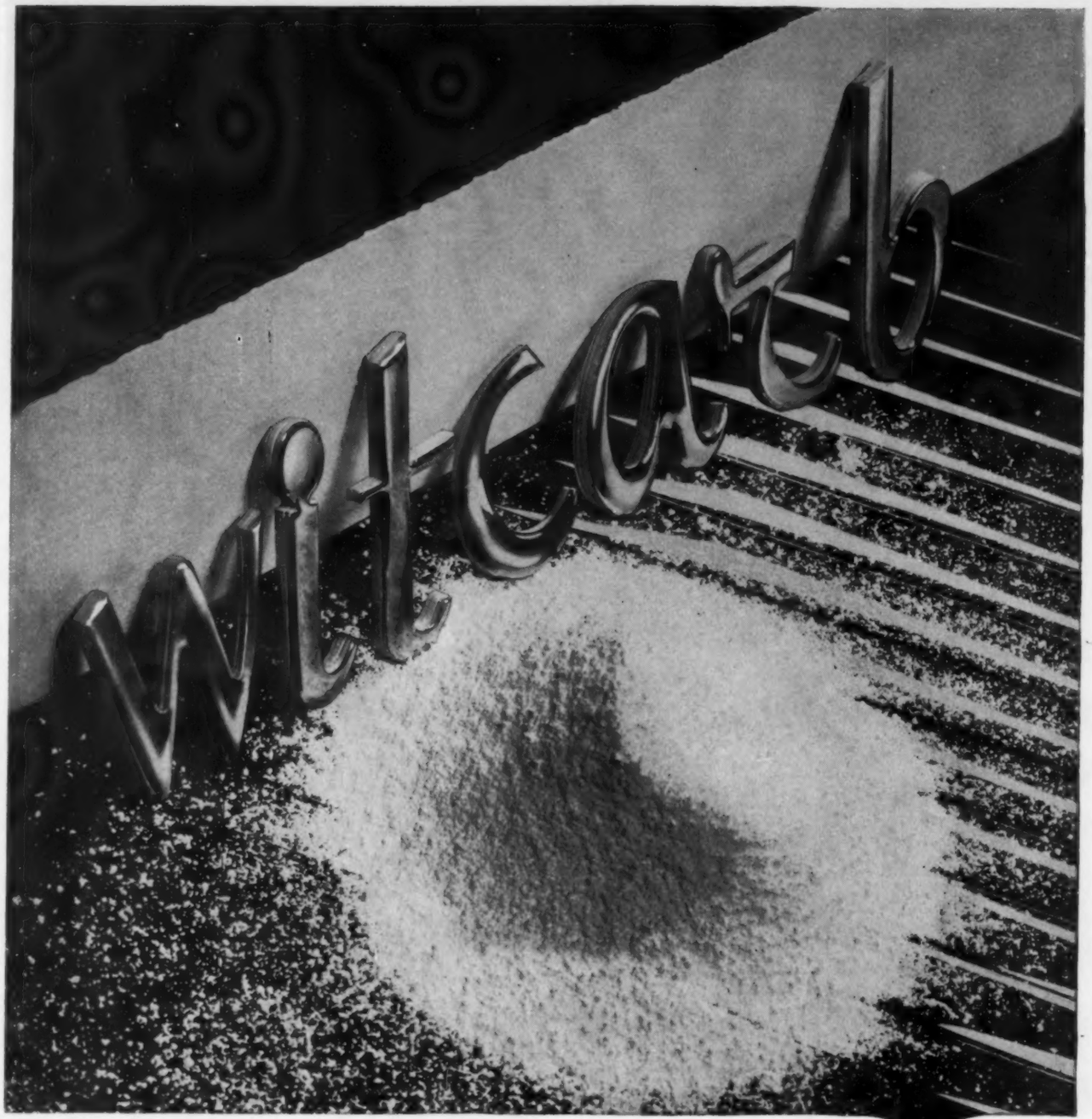
_____

← MAIL THIS COUPON OR USE YOUR PURCHASE ORDER

PRICES (Postpaid)

1 to 4 copies..... $5.00 each
5 to 9 copies..... 4.50 each
10 or more..... 4.00 each

NOTE: If copies are to be sent to more than one address attach separate sheet to order form.



IF you are producing rubber products in which high tensile and modulus and tear resistance are important, you will be interested in Witcarb, a new white reinforcing filler that offers special advantages in formulas that demand these properties. Witcarb deserves your attention not only because of its special merit as a white reinforcing filler, but because its low price presents an opportunity to economize while at the same time improving quality. Information on the properties of this new product is available on request. Fill out and mail the coupon, and the facts will be sent to you promptly. Use the coupon also to obtain your copy of WITCO PRODUCTS.

WISHNICK-TUMPEER, INC.

MANUFACTURERS AND EXPORTERS

New York, 295 Madison Ave. • Boston, 141 Milk St. • Chicago, Tribune Tower • Cleveland, 616 St. Clair Ave., N. E. • Witco Affiliates: Witco Oil & Gas Company • The Pioneer Asphalt Company • Panhandle Carbon Company • Foreign Office, London, England

WISHNICK-TUMPEER, INC.
295 Madison Avenue, New York, N. Y.

Gentlemen: Please send me a free copy of WITCO PRODUCTS. I am interested in the following:

- ☐ Witcarb
- ☐ Witco Magnesium Carbonate
- ☐ Witco Blanc Fixe
- ☐ Witco Barytes
- ☐ Witco Carbon Blacks

Name_____ Title_____

Firm_____

Address_____

City_____ State_____

Dept. I

We Can Put Our Finger Right on This Trouble!

We'll Pay Cash for spare or worn-out Banbury parts at once. Check and write us today what you have available.

When your Banbury begins to lose its mixing efficiency we can put our finger right on the trouble quickly—and correct it . . . More than that, our skill and experience in repairing and re-building Banbury's enables us to anticipate such trouble before it happens—when you give us the "go-ahead" for a check-up on your units . . . Our service assures 100 per cent restoration of Banbury efficiency whether it is resurfacing rotors and mixing chamber parts with our own development in hard-surfacing alloy, or a complete re-building . . . Why not call us for a check-up on your Banbury and avoid a more serious production tie-up later?

Are Worn Parts in Your Banbury Reducing Mixing Efficiency ?

SERVING THE RUBBER INDUSTRY

914 Miami Street *Akron, Ohio* *Phone JE 7970*

INTERSTATE WELDING SERVICE

Main Plant **AKRON, OHIO**

EXCLUSIVE SPECIALISTS IN BANBURY MIXER REBUILDING

For Some Uses...Better than The Originals

Electric Bulb...

Man-Made Alternate for the Sun

Nylon...

Man-Made Alternate for Silk

DISPERSITE...

Man-Made Alternate for Latex

★

Dispersions Process, Inc.

ROCKEFELLER CENTER NEW YORK

Stamford Neophax Vulcanized Oil

(REG. U. S. PAT. OFF.)

For Use With Neoprene

THE STAMFORD RUBBER SUPPLY CO. STAMFORD CONN.

Makers of Stamford Factice Vulcanized Oil Since 1900

ROBERT BADENHOP CORPORATION

•

CRUDE RUBBER

GUTTA PERCHA
LIQUID LATEX

GUTTA SIAK
BALATA

•

WOOLWORTH BLDG. (TEL. COrtland 7-6920) NEW YORK, N.Y.

AN APPROVED CLAY

SOUTHEASTERN CLAY COMPANY
AIKEN, SOUTH CAROLINA

INTERNATIONAL PULP CO., *41 Park Row, New York, N.Y.*

SOLE PRODUCERS OF PURE **ASBESTINE** SPECIALLY PREPARED FOR USE IN RUBBER

Covered and Protected by Letters Patent Registered at U. S. Patent Office, Washington, D. C.

LIBERAL WORKING SAMPLE FURNISHED FREE

SOFTENERS and PLASTICIZERS
For RUBBER
From the Pine Tree

ROSIN OIL
PINE TAR
BURGUNDY PITCH
GALEX a non-oxidizing RESIN
Send for "Pine Tree Products" *Booklet*

NATIONAL ROSIN OIL & SIZE CO.
R. K. O. BUILDING, RADIO CITY, NEW YORK, N. Y.
Plant: Savannah, Ga. Branches in Principal Cities
PIONEERS OF THE INDUSTRY

COLORS for RUBBER

Red Iron Oxides
Green Chromium Oxides
Green Chromium Hydroxides

•

Reinforcing Fillers and Inerts

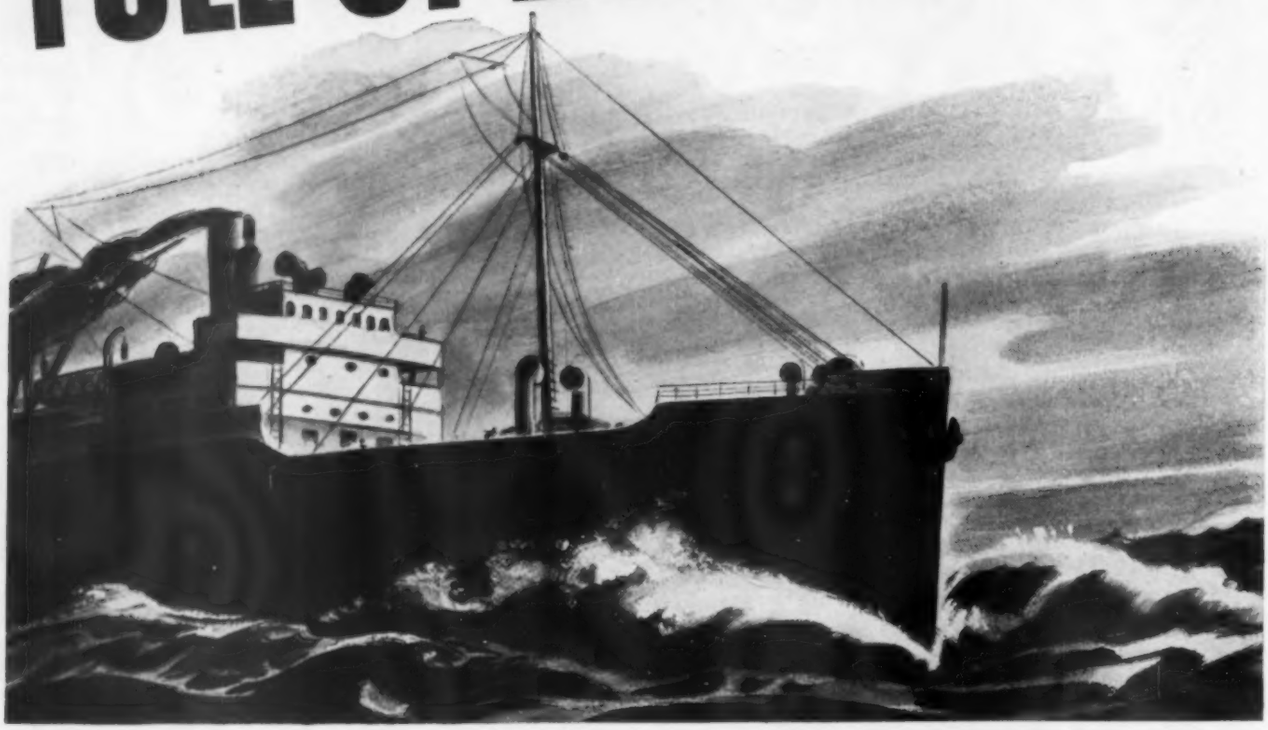
C. K. WILLIAMS & CO.

EASTON, PA.

A MERRY CHRISTMAS
TO ALL

JOHN ROYLE & SONS PATERSON, N.J.

FULL SPEED AHEAD!



SURMOUNTING the difficulties attendant to making delivery of *what you want when you want it* is all a part of our regular day's work. When you MUST have solvents right now, *or else*—tell it to us and you'll get them. The entire Skellysolve organization is geared to heavy-duty performance. It had to be that way to get where it is today!

As to unvarying dependability of Skellysolve quality—that important point is fully guaranteed.

SKELLYSOLVE
in the
RUBBER INDUSTRY

There are six different types of Skellysolve which are especially adapted to various uses in the rubber industry, for making rubber cements, and for many different rubber fabricating operations. Skellysolve offers many advantages over benzol, rubber solvent gasoline, toluol, carbon tetrachloride, etc. It will pay you to investigate Skellysolve. Write today.

SKELLY

SKELLYSOLVE

SOLVENTS DIVISION, SKELLY OIL CO.
SKELLY BLDG., KANSAS CITY, MO.

When APPEARANCE *is* IMPORTANT

Use TITANOX

TITANOX has revolutionized the *pigment thinking* of the nation—has given a new conception of what can be done with white pigments. That maximum brightness and whiteness with strong resistance to after yellowing are attained through the use of TITANOX with minimum pigmentation is an accepted truth throughout the rubber industry.

Therefore if *appearance* of your product is important, is it not logical to use TITANOX pigments which give superior results in that respect?

Assistance in solving technical rubber problems involving the use of white pigments is freely offered by our Service Department. Send us your problems.

TITANOX PIGMENTS for RUBBER COMPOUNDING

TITANOX-A (titanium dioxide)—great tinctorial strength—lowest cost per unit of color—greatest reinforcement.

TITANOX-C (titanium calcium pigment)—low volume cost for whiteness and brightness—superior in reinforcing to ordinary fillers.

TITANIUM PIGMENT CORPORATION, *Sole Sales Agent*

111 Broadway, New York, N. Y. • 104 South Michigan Ave., Chicago, Ill. • National Lead Company (Pacific Coast Branch) 2240 24th St., San Francisco, California

TITANOX

TRADE MARK

READY . . .

Today, Production for *VICTORY* is the dominant urge in America . . . Irrespective of the limitations imposed through the restrictions of raw materials, American Industry must meet the greatest duty in history . . . In Rubber more efficient means must be constantly sought for producing the needs of soldier, sailor and civilian. Substitutions must be applied in order to conserve other materials for more essential needs . . . To this end we pledge our cooperation in giving research engineers, chemists and production engineers the *Precision* compounding materials needed for more and better products . . . Write today for full information on Standard's *Precision* line of compounding materials for Synthetic, Natural and Reclaimed rubbers . . .

☆

To Make your allocations go farther, compounds work better and finished products serve longer we offer:

PLASTICIZERS—for plasticizing all types of rubber, making it possible to incorporate greater amounts of pigments and fillers which conserve rubber . . .

RESINS—as a partial replacement for rubber and for improvement of finished products . . .

RUBBER SUBSTITUTES — for partial rubber replacement —an aid in processing that speeds up milling, calendering and tubing . . .

STANDARD

Chemical Company

AKRON SAVINGS AND LOAN BLDG. AKRON, OHIO

PERBUNAN

Trade Mark Reg. U.S. Pat. Off.

IS A NEW STRUCTURAL MATERIAL

In the solution of many of your structural problems, Perbunan can play a major part. This fine synthetic rubber is particularly notable for:

1. **Oil resistance.**
2. **Heat resistance.**
3. **Long life.**

A plentiful supply of Perbunan is assured, because Perbunan is made essentially from petroleum—a domestic product. Send for full information and test samples.

STANCO DISTRIBUTORS, INC.
26 Broadway, New York City

RUBBER SULPHURS

COMMERCIAL RUBBERMAKERS' SULPHUR
TIRE BRAND, 99½% PURE

•

REFINED RUBBERMAKERS' SULPHUR
TUBE BRAND, 100% PURE

CRYSTEX (INSOLUBLE) SULPHUR

SULPHUR CHLORIDE — CAUSTIC SODA
CARBON BISULPHIDE — CARBON TETRACHLORIDE

STAUFFER CHEMICAL COMPANY

420 LEXINGTON AVE., NEW YORK, N. Y.
555 SO. FLOWER ST., LOS ANGELES, CAL.
FREEPORT, TEXAS
624 CALIFORNIA ST., SAN FRANCISCO, CAL.
230 NO. MICH. AVE., CHICAGO, ILL.
APOPKA, FLORIDA
424 OHIO BUILDING, AKRON, OHIO

REINFORCING
CALCIUM
CARBONATE

HIGH TENSILE • HIGH TEAR RESISTANCE
LOW MODULUS • SMOOTH PROCESSING
LOW VOLUME COST

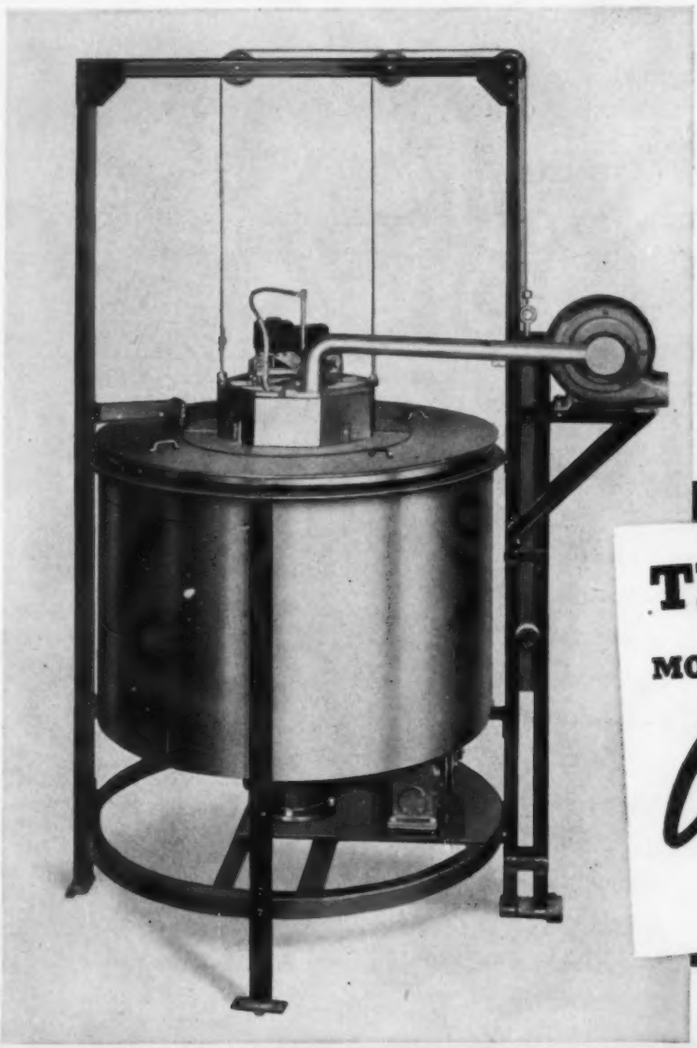
CALCENE

PITTSBURGH PLATE GLASS COMPANY
Columbia Chemical Division
30 ROCKEFELLER PLAZA
NEW YORK, N.Y.

Chicago • Boston • St. Louis • Pittsburgh • Cincinnati • Cleveland • Minneapolis • Philadelphia • Charlotte

A *Light Resistance* TEST

FOR RUBBER AND RUBBER-LIKE COMPOUNDS



● Deterioration of rubber products under the destructive action of sunlight or more intense ultra-violet radiation can be rapidly predetermined in the "National" Model X-1-A Accelerated Weathering Unit. This unit incorporates all essential features recommended for testing materials of this type.

Test conditions can be adapted to the reproduction of natural weather conditions, including close approximation of natural sunlight, by using "National" Sunshine carbons at the arc. By the use of "National" C carbons the test samples can be subjected to intensified ultra-violet radiation.

THE NATIONAL TRADE-MARK

MODEL X-1-A *Accelerated* **WEATHERING UNIT**

WRITE FOR BULLETIN L-6400
GIVING COMPLETE INFORMATION ON THIS UNIT

NATIONAL CARBON COMPANY, INC.
Unit of Union Carbide and Carbon Corporation
UCC

Carbon Sales Division: Cleveland, Ohio
GENERAL OFFICES
30 East 42nd Street, New York, N. Y.
BRANCH SALES OFFICES
New York, Pittsburgh, Chicago, St. Louis, San Francisco

CAPITOL PROCESS LINER TREATMENT

The Capitol Process of Liner Treatment is an economical and efficient method of rendering cotton piece goods repellent to adhesion of rubber stocks. It fills a distinct need for a low cost treatment of fabrics to give them non-sticking properties and long life.

Should your stocks require no **specially treated** liners to prevent adhesion, our processing of the fabrics you now use will lengthen the duration of their usefulness many times over and create an important reduction in your annual purchases of cotton piece goods for this purpose.

Try the CAPITOL PROCESS on your next order of Rubber Repellent Liners

•

TEXTILE PROOFERS, Inc.
One Gates Ave., Jersey City, N. J.

IN THIS EMERGENCY

WHITTAKER
Established 1890

For over 50 years good service and satisfied customers have contributed to the growth of our business as a source for talcs, clays and other pigments.

Today, due to the scarcity of some products, we are unable to promptly meet the needs of many of our customers who have helped build our business, and upon whom we must in turn depend for our future success. This supply problem can only be solved through mutual understanding. Toward this end, we wish to exert every effort to aid in the needs of our customers and to suggest possible substitutions of available products if necessary until the return of more normal conditions.

WHITTAKER, CLARK & DANIELS, INC.
260 West Broadway New York City

863

AN UP-TO-THE-MINUTE SOURCE

for YOUR black

At Continental's modern, up-to-the-minute 163-acre plant at Sunray, Texas, there are seven large units, devoted exclusively to the production of seven grades of carbon black. Whichever black is best suited to your particular needs, you can be sure of obtaining a constantly uniform supply. For Continental's modern production methods and strict laboratory control assure the highest standards of quality—day in and day out. And you can be sure of the *right* black when you make your selection, also. Each grade is classified according to rate of cure and processing qualities—so that you can determine accurately which grade will give you the most satisfactory results in your processes. The grades cover a wide range of requirements—from fast cure and easy processing to slow cure and hard processing. Ordering and re-ordering is thus reduced to a simple, exact procedure. The grade you select becomes standard to your regular demands. If you have unusual needs in blacks for special purposes, Continental's technical staff will gladly assist you in determining the correct grade for these purposes. The grades are listed below for your convenience. For more complete and accurate service in carbon black, call on Continental.

CONTINENTAL CARBON COMPANY

295 MADISON AVENUE • NEW YORK, N. Y.

AKRON SALES OFFICE: Peoples Bank Bldg., Akron, Ohio • PLANT: Sunray, Texas

ONE OF THESE 7 GRADES IS *YOUR* black

CONTINENTAL A:
Fast Cure, Easy Processing

CONTINENTAL B:
Fast Cure, Medium Processing

CONTINENTAL C:
Medium Cure, Easy Processing

CONTINENTAL D:
Medium Cure, Medium Processing

CONTINENTAL E:
Medium Cure, Hard Processing

CONTINENTAL F:
Slow Cure, Medium Processing

CONTINENTAL G:
Slow Cure, Hard Processing

Continental

ZINC IN DEFENSE-

NO. 3 OF A SERIES

PAINT
DIE CASTING
CERAMICS
BRASS
METAL SPRAYING
GALVANIZING
PHARMACEUTICALS
NICKEL SILVER
NO. 1 HULL PLATES
NO. 2 RUBBER

PAINT SERVES DEFENSE IN:

Aircraft
Camouflaging
Cantonments
Combat Cars
Guns
Industrial Plants
Marine Equipment
Pontoon Bridges
Scout Cars
Shells
Troop Carriers—
And In Many Other Ways

U. S. ARMY AIR CORPS PHOTO

THE ELEMENTS ARE ALSO DESTRUCTIVE!

The primary requirement of many defense items is the ability to withstand the destructive forces of war. But there are other forms of attack to be reckoned with as well—rust, chemical corrosion, and the destructive forces of the elements on land and sea. The answer to these problems is paint. Uncle Sam is faced with the biggest painting job in the history of the country—a job in which zinc pigments are playing a vital part.

No man can estimate the amount of zinc pigments needed to complete this job, but the final figure will be a staggering one. The camouflage painting, shown above, is only a small part of the story. Everything from shells to ships, from cannon to cantonments has already been covered by hundreds of exacting Government paint specifications—requiring quantities of zinc sulfide, zinc oxide, lithopone, zinc dust and zinc chromate.

Listed above are typical uses for paint coatings in defense. Zinc pigments are doing the same job in these defense paints as they have been doing in the paint industry year in and year out—protecting property and improving sanitation, too, when that is a factor. It is the increased demand for each of the zinc consuming products required in the Defense Program which is making it difficult for non-defense users to obtain all of the zinc they would like to use. This is part of the price that must be paid for national security.

PAINT PROTECTS AMERICA
ZINC PROTECTS PAINT

THE NEW JERSEY ZINC COMPANY

MANUFACTURERS OF THE FAMOUS HORSE HEAD ZINC PRODUCTS

The RUBBER AGE

One of the World's Outstanding Rubber Journals

M. E. LERNER
Editor

M. CLIFFORD
Production Manager

R. E. GAINES
Circulation Manager

PETER P. PINTO
General Manager

VOLUME 50
NUMBER 3

CONTENTS FOR DECEMBER, 1941

Rubberized Cotton Fabric Balloons Used in Construction of Defense Homes 189

Trilinear Compounding—*By D. B. Forman* 191

Accelerators for Latex: Water-Soluble vs Water-Insoluble —*By H. H. Abernathy* 195

Light and Accelerated Light Aging of Rubber, Synthetic Rubber and Rubber Substitutes (Conclusion)—*By T. A. Werkenthin and D. Richardson, R. F. Thornley and R. E. Morris* 199

Electrical Properties of Conductive Rubber 203

Electronic Tornado Welds Seam Near Rubber Gland 205

•

REGULAR DEPARTMENTS

New Equipment Section ..	218	Obituaries	217
Book Reviews	223	Los Angeles News	214
Editorial	206	Rubber, Cotton Markets ..	226
Late Domestic News	207	Chemical Markets	228
Financial News	210	Statistics	229
Names in the News	213	Market Place	233
Coming Events	208	Classified Ads	237

•

Also Publishers of:

RUBBER RED BOOK
Directory of the Rubber Industry
Published Biennially

ANNUAL BIBLIOGRAPHIES OF RUBBER LITERATURE
Compiled by D. E. Cable, Ph.D.
First issue covers year 1935

LATEX IN INDUSTRY
By Royce J. Noble, Ph.D.
Text Book on Latex

LATEX AND ITS INDUSTRIAL APPLICATIONS (Vol. I)
By Frederick Marchionna
Bibliography of latex patents and literature to June, 1932.

LATEX AND RUBBER DERIVATIVES AND THEIR INDUSTRIAL APPLICATIONS (Vols. II & III)
By Frederick Marchionna
Bibliography of latex patents and literature from June, 1932 to January, 1937; rubber derivatives to January, 1937.

Published on the 15th of each month by

PALMERTON PUBLISHING COMPANY, INC.

Printing office,
East Stroudsburg, Pa.

Editorial and Advertising Offices,
250 West 57th St., New York City

New England Representative—F. ROYAL CAREY, P.O. Box 133, Providence, R. I.
Western Representative—IRVING V. KOCH, 64 East Lake St., Chicago, Ill.

Entered as Second Class Matter, October 20, 1933 at the Post Office at East Stroudsburg, Pa., under Act of March 3, 1879. Subscription Rates: Domestic, $3.00 a year; Canada, $3.50; Foreign, $4.00. Single copies up to 3 months old, 35 cents; over 3 months old, 50 cents. Telephone COlumbus 5-2923, 5-2924.

Contents Copyrighted 1941 by the Palmerton Publishing Company, Inc.

Indexed in Industrial Arts Index. OFFICERS: P. L. Palmerton, President; E. D. Osborn, Vice-President and Secretary; Peter P. Pinto, Treasurer.

We have 3 customers

THE ARMY...THE NAVY...AND YOU

They are also *your* customers. Your rubber products must give maximum service to conserve the rubber supply.

Naugatuck Chemical manufactures a full line of superior chemical products for the rubber industry. We are doing everything possible to maintain this supply. And we will do all we can to maintain and improve that quality of product and of service that led You to give us so much of your business in the past.

Naugatuck Chemical

DIVISION OF UNITED STATES RUBBER COMPANY
ROCKEFELLER CENTER NEW YORK, N. Y.

The RUBBER AGE

VOL. 50, No. 3 DECEMBER, 1941

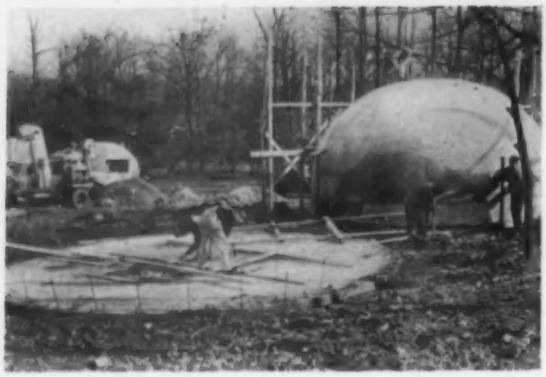
Rubberized Cotton Fabric Balloons Used in Construction of Defense Homes

COTTON and rubber, those inseparable components which have contributed so much to modern transportation and comfortable living, now make possible a new economic, high speed construction technique, currently being demonstrated for the first time on a Defense Homes Corporation project at Falls Church, Va., near the national capital.

The new construction method employs the use of an inflatable rubberized fabric form or balloon, over which concrete is shot pneumatically to form the basic shell for the building. The balloons may be made in the shape of a hemisphere or semi-cylinder, in any practical size desired. Farm homes, stables, granaries and all other types of farm buildings, as well as city dwellings, can be built by this new process quickly and inexpensively.

The Falls Church Defense Homes project is devoted to the production of attractive, inexpensive dwellings, each comprised of two hemispherical sections erected several feet apart and connected with a covered areaway divided into entrance hall, bath and kitchen. One of the hemispheres is divided by a wall into two ample bedrooms and the other is a spacious living room with fireplace. A surprising amount of closet space is obtained by taking advantage of the corner areas where-

Front view of a completed house, built by the balloon method. Dome on right provides large living room with fireplace; areaway in center space for entrance hall, kitchen and bath; dome on left is divided into two bedrooms, approximately 10 by 14 feet.



The gunite, or concrete shooting unit, is seen at left in the background of the above reproduction. Concrete base for half of housing unit is seen in the foreground and in the right background is the inflated balloon form being covered with wire mesh preparatory to applying gunite.

ever vertical walls are joined to the arc of the outer shell, or dome.

Outline of the building processes employed on the initial project gives best insight to the almost unlimited possibilities for this type of construction for housing, farm buildings, barracks, dormitories, hangars, warehouses and various other building enterprises.

First step is preparation of a circular concrete floor, or base, approximately 23 feet in diameter. Spaced at frequent intervals around the outer perimeter and imbedded in the concrete are steel hooks which are used to anchor sections of small pipe bent to the same arc as the circular base's circumference.

Flat side of the uninflated balloon is laid out on the concrete base. Entirely around the base, or flat side of the balloon, is a series of grommets, or eyelets, and these are tightly laced to hook-anchored pipes with stout cord to hold the balloon firmly in place. The balloon is now ready for inflation from an air line to a pressure of approximately one and one-half pounds to the square inch.

When fully inflated the balloon is dusted with a compound to prevent concrete from sticking to it. The whole hemisphere next is covered with two-inch, 16-gauge welded wire mesh, to serve as a bond for the concrete which is shot over the entire balloon to a thickness of approximately one inch by the gunite process. Framework for doors, windows and other desired apertures are fixed in place before applying the gunite, so concrete can be shot around them, making the frame an integral part of the shell.

Concrete Has High Strength Factor

The concrete used has a high strength factor and dries quickly. The gunite mixture's strength factor is approximately 7,000, compared with a strength factor of 2,000 for ordinary concrete. It takes between two and one-half to three hours to shoot the concrete for the shell and 24 hours later the balloon may be removed and set up for the next section.

The outer surface of the resultant inner-shell is vapor-sealed with an asphaltic base compound, applied by stiff brush, and the structure is ready immediately for application of insulation. Insulation in the form of ground pulp in an asphalt emulsion may be sprayed on to a thickness of approximately one and one-half inches, or a specially prepared blanket of the same thickness of balsam wool may be applied in even shorter time.

Building May Be Painted Any Color

Over the insulation again is placed a covering of wire mesh and the final coat of gunite is applied to a thickness of between two and three inches. After the outer layer dries, the building may be painted any desired color with paints which permit breathing so that any trapped moisture may escape. Interior fitting and decorating proceeds in the conventional manner.

Gunite consists of standard Portland cement and sand mixed dry and carried from the mixer by a conveyor into an air lock known as a cement gun. The mixture is forced through rubber hose to the nozzle in dry form. Another hose brings water to the nozzle and hydration takes place as the concrete ingredients are emitted together. The balloons are of tough rubberized cotton fabric construction, quite similar to that employed in the production of automobile and truck tires.

Originator of the balloon building process and designer of the houses under construction at Falls Church, is Wallace Neff, West Coast architect. Construction on the project is by the Case Construction Co., of San Pedro, Calif., and the balloons, or inflatable hemispheres, were especially designed for the purpose by the Goodyear Tire & Rubber Co.

Vern D. Case, head of the construction company, estimates that concrete houses identical or similar to those now being erected at Falls Church could be produced at the rate of 100 in sixty days or 200 in ninety days, using only four balloon forms in the construction cycle.

Gunite operator shooting concrete against the balloon form in the first step of actual house construction. The wire mesh is pulled out with a hook so that the concrete works behind it as well as over it, thus imbedding the mesh in the shell.

Trilinear Compounding

By D. B. FORMAN

Rubber Laboratory,
E. I. du Pont de Nemours & Co.,
Wilmington, Delaware

TRILINEAR compounding enables the factory compounder to select the particular rubber or synthetic rubber composition that will have specified physical properties. It saves time in eliminating trial and error methods of compounding. Briefly, charts of this type actually tell the ratio of rubber or synthetic rubber: filler: softener and similar charts can be made to show other systems.

Every rubber chemist knows that there are two primary methods of altering the physical properties of vulcanized rubber and synthetic rubber—chemical and physical. The former is controlled by antioxidants, accelerators, activators, and other curing agents; the latter is controlled by fillers and softeners. This discussion deals with the physical methods that are applicable after factors influencing rate and state of cure have been fixed.

This method of compounding has been named "Trilinear Compounding". It employs charts that show the effects of varying three ingredients in a compound. In other words, it deals with a compound as a unit that is divisible into three parts. Trilinear compounding is not new. It is used regularly in the paint and plastics industry. Undoubtedly, several rubber chemists have used it in connection with compounding by chemical means and in many special applications but its recourse to fillers and softeners is believed to be new to most rubber chemists.

Description of Chart

A trilinear coordinate chart, Fig. I, is the basis of trilinear compounding. The use of these charts comes from a simple function of plane geometry. The sum of the perpendicular distances from any point on the surface of an equilateral triangle to the three sides is equal to the height of the triangle.

However, the charts can be used in an easier and more practical manner than geometric interpretation. In Fig. I, the key points are identified by assigned letters. Each apex, A, B and C, represents 100% of a definite material. In compounding polymers, one of the materials is designated as the base and it usually contains more than one ingredient. The three components must be quoted in identical units, and they are designated on a volume basis so that all possible combinations (with respect to actual weight) are included.

In the charts which follow, the base is Neoprene Type GN plus the necessary modifying agents required for vulcanization and processing. The point A will represent 100% by volume of this neoprene base. The points B and C will represent 100% by volume of any two other components used to complete a compound. Each base line represents 0% by volume of the material represented by the opposite apex. The perpendicular distances from any base line to the opposite apex is divided into 10 units for convenience in stating percentage by volume composition. For example, the point G, where the lines AF, BD and EC intersect, represents a composition containing 33⅓% by volume of each of the three components. However, any point within the triangle represents 100 parts by volume of the whole composition. Point H would be 50% of component A, 25% of component B and 25% of component C, all of which are on a volume basis.

These charts are of great value when studying the properties of compositions because the effects of varying the composition can be followed. Areas are thus found on the trilinear chart that will represent compositions producing a specific range of properties. Existing or new data may be used to construct a chart. In the former case, the points representing compositions that have been tested are located and then the data are transposed to the respective points. Thus, a range of properties with respect to composition is plotted on the graph. Conversely, a new chart can be constructed by first spotting compositions on a graph and then testing those compositions. This latter method probably has the largest general use.

Use of Trilinear Charts

As previously indicated, these charts may be applied to rubber or synthetic rubber. The number of charts that can be constructed is almost infinite. Neoprene was used to develop this means of compounding because such a base is fixed more than a rubber base. Two trilinear charts will be described.

The first three-phase system, Figure II, includes Neoprene Type GN base, Neophax A, and Circo Light Process Oil. The three bisecting axes of the equilateral triangle of the chart that are divided into 100 equal

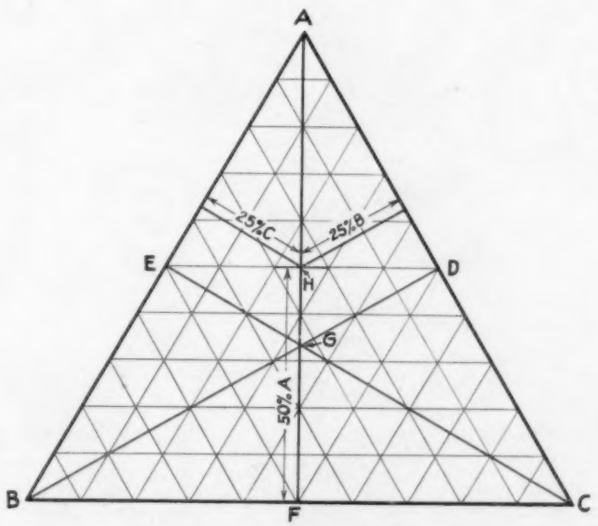


FIG. 1.

NOTE: This paper was awarded Honorable Mention in the 1941 Papers Contest conducted by the New York Group, Rubber Division, A.C.S.

parts, each represent one volume of their respective components. The AF axis refers to neoprene base, the CE axis refers to Circo Light Process Oil, and the BD axis refers to Neophax A.

Contours or curves have been plotted on Fig. II that classify the compositions represented by the graph according to their hardness and swelling in kerosene (2 days at 100° C.).* The contours labeled by circled figures refer to swelling and the others refer to hardness. It will be noted that swelling is plotted in 10% volume increase ranges and hardness in 4 point ranges of the Shore durometer. Therefore, any "square shaped" area describes the compositions of that area with respect to hardness and swelling.

For purposes of illustration, let it be assumed that a compounder desires the formula of a soft neoprene stock, having a hardness of 20 to 25 and a volume increase of 90 to 100% in kerosene. He selects point R. (indicated on Fig. II) and then proceeds to determine the formula of this composition. He reads from the chart that Compound R Contains:

46.15% Neoprene base by volume	= N
41.95% Neophax A by volume	= X
11.90% Circo Process Oil by Volume	= Y
100.00% Compound by volum	

It is obvious that the sum of N, X and Y volumes is equal to 100 volumes of compound. However, since all factory compounding is done on a weight basis, he must transform this volume composition to a practical formula. From the original data used in constructing the chart, it is known that the neoprene base of the graph is a complete gum stock including all ingredients that affect physical properties by chemical reaction or catalysis. This base gum stock has already been adjusted to produce a good state of cure in 40 minutes at 287° F. The formula can now be written:

		Parts by Weight
Neoprene base (N = 46.15% by volume)	Neoprene Type GN (s.g. 1.25)	100.0
	Latac (s.g. 1.17)	0.375
	Stearic Acid (s.g. 0.92)	0.5
	Neozone A (s.g. 1.18)	2.0
	Ex. l.t. Calcined Magnesia (s.g. 3.20)	4.0
	Zinc Oxide (s.g. 5.57)	5.0
		111.875
Neophax A (X = 41.95% by volume)	= Neophax A (s.g. 1.04)	x
Circo Process Oil (Y = 11.9% by volume)	= Circo Process Oil (s.g. 0.92)	y
Compound (N + X + Y = 100% by volume)	= Weight of Whole Compound—111.875 + x + y	

The weight of Neophax A and Circo Process Oil must be calculated. This can easily be done by substituting the values of N, X, and Y in simple equations and solving for x (weight of Neophax) and y (weight of process oil). The constants in the equations are actually conversion factors based upon the specific gravities of the three components of the chart. These constants must be determined for each filler or softener. In the systems described in this paper, the constant for any diluent = specific gravity of diluent (filler or softener) x specific volume of neoprene base (84.71). The specific volume of the neoprene base is determined by dividing its weight (111.875) by its specific gravity (1.282).

* The kerosene used in this work had an aniline point of approximately 145° F. For details see Fraser, *Rub Chem. & Tech.*, Vol. 14, No. 1, January, 1941.

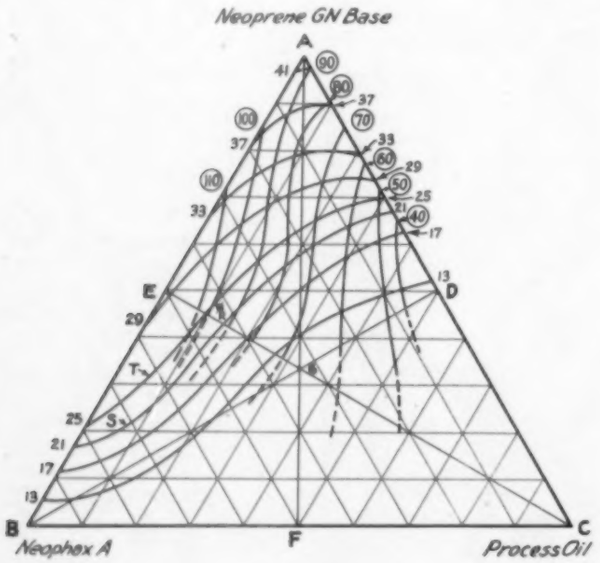


FIG. 2.

Volume increase in kerosene indicated by figures in circles (per cent); Shore durometer hardness indicated by other figures.

TABLE I—PHYSICAL PROPERTIES OF NEOPRENE TYPE GN BASE, NEOPHAX A AND CIRCO PROCESS OIL COMPOSITIONS, CURED 40 MINUTES AT 287° F.
(40 pounds steam pressure/sq. in.)

Volume Composition: Neophax A W/N (1)	Process Oil W/N (1)	Per Cent Neoprene Base	Per Cent Neophax A	Per Cent Process Oil	Modulus at 500%	Tensile Strength	Elongation	Shore Hardness	Volume Inc. Kerosene 2 days/100° C.
..	..	100.00	....	...	475	3500	850	42	93.7
..	10	88.80	....	11.2	375	2675	920	36	76.7
..	20	79.60	....	20.4	225	2200	930	31	62.4
10	..	89.78	10.22	...	525	2550	850	39	97.0
20	..	81.44	18.56	...	575	2300	900	37	103.9
40	..	68.68	31.32	...	725	1525	825	34+	111.3
80	..	52.35	47.65	...	725	825	640	31	131.2
20	10	73.70	16.80	9.5	425	1750	870	31	81.9
20	20	67.40	15.30	17.3	325	1550	920	27	71.8
40	20	58.40	26.60	15.0	425	1175	850	26	87.7
80	10	49.10	44.60	6.3	650	925	740	27	121.4
80 (2)	20	46.15	41.95	11.9	525	800	760	23	96.0
80	40	41.20	37.60	21.2	350	575	750	17	78.0
130	..	40.40	59.60	...	...	750	420	29	124.0
..	..	....	100.00	...	...	.....	.....	11	dissolved
15	50	55.10	9.40	35.5	175	1150	1020	16	52.7
90	80	32.80	33.50	33.7	225	350	650	10	65.3
160	40	30.00	54.60	15.4	...	450	410	19	79.5
35	90	37.40	14.90	47.7	125	600	1020	7	50.0
350	..	20.10	79.90	...	...	275	210	25	134.0
50	50	45.20	25.70	29.1	275	725	915	16	77.1

(1) Parts by weight per 100 parts of neoprene.
(2) Compound R, see text.

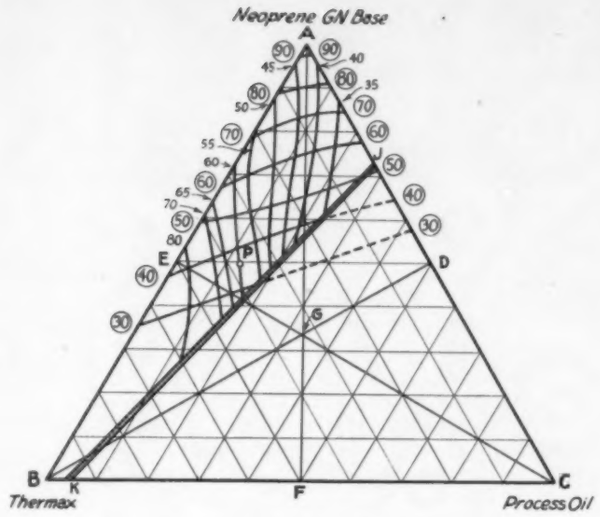


FIG. 3.

Volume increase in kerosene indicated by figures in circles (per cent); Shore durometer hardness indicated by other figures.

$$y = \frac{Y}{N} \times \text{constant} = \frac{11.9}{46.15} \times 77.9 = 20 \text{ parts by weight Process Oil}$$

$$x = \frac{X}{N} \times \text{constant} = \frac{41.95}{46.15} \times 88.1 = 80 \text{ parts by weight Neophax A}$$

Therefore, by substituting the values of x and y just calculated in the formula shown, the completed formula of this compound, R, having the selected properties, becomes:

Compound R

Neoprene Type GN	100.0
Latac	0.375
Stearic Acid	0.5
Neozone A	2.0
Extra Light Calcined Magnesia	4.0
Neophax A	80.0
Circo Process Oil	20.0
Zinc Oxide	5.0

In general, Fig. II is a compounding guide for stocks having a Shore Durometer hardness range of 42 to 0. It was constructed from the data in Table I. The hardness values of the compounds in Table I plotted on the chart and contour lines were drawn to show areas in which all compositions have the same hardness. For example, the hardness of the vulcanizate of any compound within the area between the contours S and T is 21 to 25 regardless of the ratio; Neoprene base:Neophax:Oil. Compound R, just discussed, is within this area and has a hardness of 23.

In addition to durometer hardness, other contours show the resistance to swelling in kerosene of these soft neoprene compositions. The direction assumed by these contours is more or less perpendicular to the hardness curves and a network of "square shaped" areas is formed. These areas each represent a group of compounds whose hardness and volume increase in kerosene is within the respective ranges shown. In this chart, the swelling contours are not extended to the base of the triangle because compositions of Neophax and carbon black alone are not practical.

TABLE II—PHYSICAL PROPERTIES OF NEOPRENE TYPE GN BASE, THERMAX AND CIRCO PROCESS OIL COMPOSITIONS, CURED 40 MINUTES AT 287° F.
(40 pounds steam pressure/sq. in.)

Volume Composition									
Thermax W/N (1)	Process Oil W/N (1)	Per Cent Neoprene Base	Per Cent Thermax	Per Cent Process Oil	Modulus at 500%	Tensile Strength	Elongation	Shore Hardness	Volume Inc. Kerosene 2 days/100°C.
....	...	100.0	....	....	475	3500	850	42	93.7
28.8	...	84.2	15.8	....	1525	2200	740	52	74.9
28.8	20.0	69.15	13.09	17.76	825	2325	930	38	57.0
57.6	...	73.25	26.75	....	1900	1950	520	59	67.3
57.6	10.0	66.4	25.1	8.5	1675	2000	715	52	57.4
57.6	20.0	61.1	23.15	15.75	1275	1950	810	45	46.7
86.4	...	63.8	36.2	....	....	1875	415	65	57.1
86.4	10.0	59.0	33.4	7.6	1825	1825	500	56	48.3
115.2	...	57.0	43.0	....	....	1850	250	76	47.1
115.2	10.0	53.0	40.2	6.7	....	1900	335	67	41.6
115.2 (2)	20.0	49.65	37.6	12.75	....	1875	400	60	36.7
172.8	...	46.8	53.2	....	....	1850	170	87	40.1
....	10.0	88.8	...	11.2	375	2675	920	36	76.7
....	20.0	79.6	...	20.4	225	2200	930	31	62.4
106.5	23.3	50.0	35.0	15.0	...	1475	395	56	33.1
29.5	14.8	75.0	12.5	12.5	925	1900	815	42	56.8
9.5	14.6	80.0	5.0	15.0	400	1000	675	40	63.1

(1) Parts by weight per 100 parts of neoprene.
(2) Compound P, see text.

Additional contours can be drawn or additional areas indicated on Fig. II that will classify compositions with respect to other physical properties, such as modulus, tensile strength, permanent set, and resilience.

The second three phase system used to illustrate trilinear compounding is based upon compositions containing neoprene base, Thermax, and Circo Process Oil. This system is shown in Fig. III and was based upon the data in Table II. The principles just described in discussing the Neophax A, Circo Process Oil and Neoprene Type GN base system also apply to this system, which is: Thermax, Circo Process Oil, and Neoprene Type GN base. In this chart hardness contours assume a vertical direction because the stocks become harder as the filler content increases. In constructing these hardness contours, it was necessary to assume that the hardness of Thermax (s. g. 1.80) alone is 100 and process oil alone is 0.

The formulae for transcribing volume composition of neoprene diluents to parts by weight per 100 parts by weight of neoprene are:

$$\text{Thermax} = t = \frac{T}{N} \times \text{constant} = \frac{T}{N} \times 152$$

$$\text{Circo Process Oil} = y = \frac{Y}{N} \times \text{constant} = \frac{Y}{N} \times 77.9$$

The point P on the trilinear chart of Fig. III represents a compound having a Shore hardness of 60, and contains the following volume composition:

Neoprene Base	49.65% = N
Thermax	37.60% = T
Process Oil	12.75% = Y

Upon substituting these values in the equations, the formula of the stock is derived:

Compound P	
Neoprene Type GN	100.0
Latac	0.375
Stearic Acid	0.5
Neozone A	2.0
Extra Light Calcined Magnesia	4.0
Thermax	115.2*
Process Oil	20.0
Zinc Oxide	5.0

*80 vols. per 100 vols. neoprene.

In Fig. III, the horizontal contours serve to classify the compositions with respect to their volume increase in kerosene over a two day period at 100° C. These contours are based upon interpolations made from the volume increase values of several compounds. Compound P should swell between 30 and 40% and actually it swelled 36.7%.

These volume increase contours constitute an important relationship that is common to any filler used with this neoprene base and process oil. Fraser and Catton (*Ind. Eng. Chem.*, Vol. 31, p. 956, 1939) showed that the swelling of any neoprene compound by oil was independent of the filler used but was dependent upon the volume dilution of the neoprene by filler. Therefore, the volume increase contours not only apply to Thermax but also apply to other fillers when substituted for Thermax on an equal volume basis.

The line JK is very significant because it is the bloom point of compositions of this system. Any composition represented by a point below this line will exude oil after cure. Compositions represented by points above this line do not exude oil. This bloom point designation in Fig. III applies only to this system, and the blooming boundaries for other systems must be determined individually.

Other physical properties, which are indicated in an approximate manner by the hardness areas, could be shown accurately by contours. Modulus will be higher while elongation, compression set, and resilience will be lower in those areas representing harder compounds. In this system, changes in tensile strength from one composition to another follow a very narrow range. This is a characteristic of neoprene compounds containing soft carbon black. However, extreme loading of soft carbon black and/or process oil reduce the tensile strength.

Typical Applications and Scope of System

It has already been pointed out that a trilinear chart can be used to eliminate guess work and save the time of the factory compounder. From it one can select the composition that will come nearest to duplicating desired physical properties. In this respect, it should be of value in duplicating the properties of competitive samples. The two systems discussed are not the only charts that can be constructed nor do they show all of the physical properties that could be plotted. Other examples of how trilinear compounding may be applied are summarized:

1. Compounds of definite swelling resistance can be selected with respect to hardness.

2. Compounds of definite hardness and swelling resistance can be selected with respect to approximate modulus, tensile strength, permanent set, and resilience. These physical properties could be determined more accurately by plotting contours representative of particular properties.

3. The swelling resistance of compounds containing another filler substituted for soft carbon black on an equal volume basis can be determined directly from the chart.

4. The swelling of the compositions in another oil can be determined by conversion factors. The volume increase in kerosene under specific conditions is shown. Fraser (*Rub. Chem. & Tech.*, Vol. 14, No. 1, January, 1941) showed that the swelling of a given neoprene composition was dependent upon the viscosity-gravity constant or the aniline point of an oil. For example, oils having a low aniline point swell neoprene compounds the most; therefore, by analogy an oil having a higher aniline point than the kerosene used would not swell the neoprene to as great an extent. The effects of temperature and time are independent factors and swelling is proportional to time and temperature.

5. Whether or not a neoprene, Thermax, and process oil composition exudes oil can be readily determined from the location of the point representing the compound. If above the bloom line, it will not exude oil.

6. The number of three component systems that can be charted is infinite, but for all practical purposes, a few would answer most requirements. All of the systems would be made up of rubber or synthetic rubber bases, filler and softener, or any combination of the three components. These are six key systems:

a. Base Stock:filler:softener
b. Base Stock:filler:filler
c. Base Stock:softener:softener
d. Base Stock #1:Base Stock #2:filler
e. Base Stock #1:Base Stock #2:softener
f. Base Stock #1:Base Stock #2:Base Stock #3

It will be noted that any key system must contain a base stock which may be made from rubber or synthetic rubber. Furthermore, any one component can be subdivided within itself if such a subdivision remains a constant, *e.g.*, a filler may refer to a 50% by weight blend of two types of carbon black.

7. It is believed that trilinear charts can be used to plot such properties as tear resistance, water resistance, abrasion resistance, and many others.

Limitations

Many charts may be constructed showing all the various relationships desired. The only limitation is that one chart cannot be constructed to include all possible combinations. This system of compounding simplifies itself as its use is extended because conversion factors can be calculated that will refer a given compound in part or whole to another system. These conversion factors would particularly apply to the substitution of fillers and softeners for one another.

Variations in the rubber or synthetic rubber base cannot be made because each of the three components must have a constant composition within a given chart. Variations of the curing agents, accelerators, etc., of the base must be accounted for separately. However, after a composition has been selected from a point, the properties of this composition can then be adjusted by varying the components of the rubber or synthetic rubber base.

Accelerators for Latex: Water-Soluble vs Water-Insoluble

By H. H. ABERNATHY

Rubber Laboratory, E. I. du Pont de Nemours & Co., Wilmington, Delaware

ABSTRACT

SINCE accelerator loss when compounded rubber latex containing water-soluble accelerators is applied to a porous surface is difficult to determine directly, an indirect method has been applied. This method consists of studying the properties of films from the compounds made by casting on porous plates compared with films made on glass plates. Similar tests were made using films made from rubber latex compounds containing water-insoluble accelerators to determine whether variations between the glass and porous plate films are due to rough film surface or to accelerator loss.

Water-soluble accelerators produce the same rate of cure in glass and in porous plate films. Therefore, no loss of these accelerators is indicated when compounds containing them are applied to porous surfaces. Porous plate films, however, have lower moduli and tensile strengths than corresponding glass plate films. This is probably due to the difference between the porous and glass surfaces and does not indicate accelerator loss because porous plate films from compounds containing water-insoluble accelerators are similarly poorer than corresponding glass plate films. That this method of determining whether accelerator is lost into a porous plate is sufficiently sensitive is shown by examples given of the effect upon rate of cure of lowering the concentration of accelerator in a given compound.

The result of the rate of cure study above, namely, that no loss of accelerator due to water solubility occurs when latex compounds containing them are applied to a porous surface, is confirmed by the following observation. Porous plate films from compounds containing water-insoluble accelerators show practically the same decreased resistance to aging as compared with films made on glass plates that films from compounds with water-soluble accelerators do.

SINCE rubber latex is an aqueous dispersed system, the addition of compounding and vulcanizing ingredients to rubber in this form presents an entirely different problem from that encountered in adding such materials to dry rubber. Compounding materials are added to dry rubber by mixing them into the rubber on a mill or in an internal mixer, while in latex compounding the materials must be added either as aqueous dispersions or solutions. If materials are to be added to latex as aqueous dispersions, they must first be ground in some way to a stable, uniform, fine-particled suspension. The preparation of such a suspension is, at best, time-consuming and sometimes quite difficult.

It is, therefore, advantageous to the latex technologist to be able to add compounding and vulcanizing ingredients as water solutions. In the field of pigments, reinforcing agents, and fillers, there is little choice but to prepare aqueous dispersions. However, in the field of accelerators, both water-soluble and water-insoluble materials are available. It would seem, then, that given a suitable accelerator of each class the water-soluble type would always be chosen for latex work.

There is one possible specific disadvantage for water-soluble accelerators and this is in connection with their use in compounds to be applied to porous surfaces. Such a disadvantage would seriously concern manufacturers of impregnated, coated, or pile fabrics, backed carpets, coated paper, and similar products involving the coating or impregnating of a porous surface with rubber from latex. These manufacturers consumed about thirty per cent of the 33,789 tons (dry rubber content) of latex used in the United States in 1940 and are thus major users of rubber latex accelerators.

It has often been supposed that a latex compound to be coated onto a porous surface should not be accelerated with a water-soluble material. This supposition has been made on the theory that the water-soluble accelerator would be absorbed along with the latex serum into the porous surface and thus be largely lost. An examination of the literature revealed no published experimental work bearing on this theory. The experimental work reported in this paper was undertaken to supply quantitative data on this question.

The most obvious approach to this problem would be to mix a water-soluble accelerator into latex, pour a suitable quantity of the latex onto a porous surface, such as a fabric or porous porcelain plate, recover the

NOTE: This paper was awarded Honorable Mention in the 1941 Papers Contest conducted by the New York Group, Rubber Division, A.C.S.

TABLE I—BASE FORMULA

Rubber (from 60% centrifuged latex)	100.0
Sulfur	1.0
Zinc Oxide	1.0
Casein	1.0
Fatty alcohol sulfate (Aquarex D)	0.5
Accelerator .....as	shown

serum which seeps into the absorbent material and analyze it directly and quantitatively for accelerator. In practice, however, such a procedure presents many difficulties. The porous surface selected must be impermeable to water-dispersed material but freely permeable to water-dissolved material, in order to effect complete separation of the accelerator from the rubber. This is necessary because there are no accurate analytical methods for determining accelerators in the presence of rubber. These conditions of permeability also rule out the use of fabrics, since rubber in appreciable quantities either adheres to or is absorbed into them.

Unglazed porcelain plates were found to satisfy the conditions of permeability and were selected for this work. However, when the compounded latex was poured onto such porous plates and the top sealed to prevent evaporation, it was found that most of the serum was absorbed in the pores of the plate and only a small quantity seeped through. Such a small quantity of serum did not permit of accurate chemical analysis. In view of these facts, it was necessary to devise an indirect method of determining accelerator loss.

A practical indirect method consists of pouring the latex containing the water-soluble accelerator on the selected porous surface in such quantity that the film would dry completely by serum loss through the plate. Such a film is about 0.05-inch thick. A comparison between physical properties of these films and films from the same compound made by casting on a glass plate where drying is by evaporation only should reveal accelerator loss in a slower rate of cure for the porous plate films, since it is well known that reducing the amount of accelerator results in a slower rate of cure. Other physical properties, for example modulus and tensile strength, may be affected either by loss of accelerator or because of the change in the nature of the surface on which the film is cast. These two possibilities can be differentiated by running analogous experiments using water-insoluble accelerators to remove the possibility of accelerator loss.

Four widely used dithiocarbamate accelerators, two of which were water-soluble and two water-insoluble, were chosen for comparison. Dithiocarbamates were chosen because members of this class have exhibited wide general utility as accelerators for latex. The water - soluble accelerators — sodium-dibutyl-dithiocarbamate (I) and hexamethylene-ammonium-hexamethylene-dithiocarbamate (II)—were used as fifty and ten per cent solutions respectively. The water-insoluble accelerators—zinc - dibutyl - dithiocarbamate (III) and zinc-diethyl-dithiocarbamate (IV)—were used as thirty-three per cent aqueous dispersions. The two salts of dibutyl-dithiocarbamic acid were chosen to obtain a comparison between a water-soluble and a water-insoluble salt of the same acid. The latex compound selected had the base formula shown in Table I.

The quantities of sulfur and zinc oxide in the base formula (Table I) are commonly considered adequate for good vulcanization. No antioxidant was used in the compound because it was desired to study the influence of the accelerator alone on the aging characteristics of the vulcanizates.

Glass plate test films were made from the latex compounds according to the method of Wohler[1] as modified by Dales and Ayscue[2]. Porous plate test films were made according to this same procedure, except that round, unglazed, porous, porcelain dinner plates, having an inside diameter of 6 inches, were used in place of glass plates. The inside bottom surfaces of these plates were ground so that level surfaces were formed when the plates were anchored by means of adhesive tape to a flat-topped bench. A round film 6 inches in diameter and uniformly about 0.05-inch thick was formed when 60 c.c. of latex mix was poured into a plate and allowed to dry at room temperature. Loss by evaporation was prevented by sealing the tops of the plates with cellophane.

TABLE II—WATER-SOLUBLE ACCELERATORS
GLASS PLATE VERSUS POROUS PLATE FILMS

Air Oven Cure (Min./°F.)	*Stress at 600% Elongation**	*Tensile Strength at Break*	*Elongation at Break*
COMPOUND 1**—ACCELERATOR I—SODIUM-DIBUTYL-DITHIOCARBAMATE—0.5 PART			
Glass Plate Films—***Selected Cure: 5 minutes at 200°F.			
5/200	1075	5000	900
10/200	900	4800	900
20/200	1000	5000	920
30/200	925	5000	910
60/200	925	4825	935
Porous Plate Films—Selected Cure: 5 minutes at 200°F.			
5/200	875	4950	910
10/200	775	5175	930
20/200	775	5300	940
30/200	650	4025	880
60/200	600	4250	920
COMPOUND 2—ACCELERATOR II—HEXAMETHYLENE-AMMONIUM-HEXAMETHYLENE-DITHIOCARBAMATE—1.0 PART			
Glass Plate Films—Selected Cure: 30 minutes at 200°F.			
5/200	525	5150	940
10/200	1275	4075	810
20/200	1300	5100	840
30/200	1450	5525	890
60/200	1300	5275	850
Porous Plate Films—Selected Cure: 30 minutes at 200°F.			
5/200	500	4375	920
10/200	900	4800	900
20/200	1200	4975	870
30/200	1350	5200	875
60/200	1050	4350	830

*Tensile strengths and stress at intermediate elongations throughout this paper are given in English units (lbs. per sq. in.)

**Accelerator concentrations are given in parts on the dry rubber in the selected base formula.

***Selected cure is the cure at which the highest moduli are attained and is used to measure rate of cure.

(1) Wohler, J., *Ind. Eng. Chem. (Anal. Ed.)*, **9**, 117 (1937).
(2) Dales and Ayscue, "Rubber Latex Compounding," issued as Report No. 40-1 by the Rubber Chemicals Division, E. I. du Pont de Nemours & Co., Wilmington, Delaware, in January, 1940.

The series of compounds was prepared and films made and tested from them three times. The same lot of 60% centrifuged latex was used for all three runs. Checks between runs were invariably within 10% of each other. All compounds in a series run were made at the same time and films from them were poured and tested at the same time. After each run, the porous plates were thoroughly cleaned and their permeability checked. Testing was done on a standard Scott testing machine according to A.S.T.M. Specification D-412-40T using Die B (¼-inch). The temperature of the testing room was maintained at 82 ± 2° F.

Rate of Cure

Since the indirect method of determining accelerator loss depends on the relation between rate of cure and accelerator content, the first comparison between films is made from this standpoint. Table II gives a comparison between glass plate and porous plate films made from compounds containing the water-soluble accelerators. This comparison shows that the same rate of cure, as judged by moduli at 600% elongation, is produced in both types of films, indicating no loss of accelerator. However, the moduli and tensile strengths of the porous plate films are generally lower than those of the glass plate films. That this is caused by the change in type of surface rather than loss of accelerator is shown in Table III. The data in Table III show a similar inferiority for porous plate films made from compounds containing the selected water-insoluble accelerators where accelerator loss is precluded by the nature of the porous plate.

TABLE III—WATER-INSOLUBLE ACCELERATORS
GLASS PLATE VERSUS POROUS PLATE FILMS

Air Oven Cure (Min./°F.)	*Stress at 600% Elongation*	*Tensile Strength at Break*	*Elongation at Break*
COMPOUND 3—ACCELERATOR III—ZINC-DIBUTYL-DITHIOCARBAMATE—1.0 PART			
Glass Plate Films—Selected Cure: 30 minutes at 200°F.			
5/200	425	2000	900
10/200	475	3725	990
20/200	675	5225	1000
30/200	825	5150	990
60/200	775	5350	1020
Porous Plate Films—Selected Cure: 30 minutes at 200°F.			
5/200	325	2750	960
10/200	475	4225	980
20/200	550	3775	960
30/200	775	4550	895
60/200	700	4125	900
COMPOUND 4—ACCELERATOR IV—ZINC-DIETHYL-DITHIOCARBAMATE—1.0 PART			
Glass Plate Films—Selected Cure: 30 minutes at 200°F.			
5/200	675	3600	980
10/200	875	5050	1000
20/200	1075	4800	900
30/200	1100	5200	930
60/200	1050	4650	910
Porous Plate Films—Selected Cure: 30 minutes at 200°F.			
5/200	625	3300	930
10/200	825	3800	910
20/200	875	4350	880
30/200	950	4775	880
60/200	875	4075	840

TABLE IV—WATER-SOLUBLE ACCELERATORS
GLASS PLATE VERSUS POROUS PLATE FILMS

Air Oven Cure (Min./°F.)	*Stress at 600% Elongation*	*Tensile Strength at Break*	*Elongation at Break*
COMPOUND 5—ACCELERATOR I—SODIUM-DIBUTYL-DITHIOCARBAMATE—0.25 PART			
Glass Plate Films—Selected Cure: 60 minutes at 200°F.			
5/200	500	4550	1040
10/200	475	4275	1010
20/200	575	4600	990
30/200	700	5125	1000
60/200	750	5100	990
Porous Plate Films—Selected Cure: 60 minutes at 200°F.			
5/200	575	4250	960
10/200	625	4125	940
20/200	600	3900	890
30/200	650	3875	890
60/200	675	4175	895
COMPOUND 6—ACCELERATOR II—HEXAMETHYLENE-AMMONIUM-HEXAMETHYLENE-DITHIOCARBAMATE—0.5 PART			
Glass Plate Films—Selected Cure: 60 minutes at 200°F.			
5/200	775	4875	970
10/200	825	4400	920
20/200	1025	5125	900
30/200	1050	5325	900
60/200	1200	5075	860
Porous Plate Films—Selected Cure: 60 minutes at 200°F.			
5/200	825	5075	930
10/200	850	5275	930
20/200	875	5100	920
30/200	875	5050	910
60/200	900	4900	895

The particular concentrations of accelerator, based on the dry rubber content of the compound, were chosen for the above comparison because such concentrations represent quantities generally used in latex compounding. It is possible, however, that the activity of these accelerators is so great that the loss of even a considerable part of them, when the latex compounds were poured on porous plates, might not have been detected in stress-strain figures. This would be true if the rate of cure produced by the higher concentration of accelerator was no faster than that produced by some substantially lower concentration. For this reason, other compounds were made using one-half as much accelerator as originally used and films from them compared.

The data obtained from this comparison are shown in Tables IV and V. It will be noticed that, as in the case where higher concentration of accelerator was used, the water-soluble accelerators (Table IV), I and II, produce the same rate of cure in both glass plate and porous plate films and the tensile strengths and moduli are again lower for the porous plate films. Table V shows that this is again due to the change in surface on which the films were cast by showing a similar inferiority for the porous plate films made from compounds containing the water-insoluble accelerators, III and IV.

That the reduced concentration of accelerator produces a slower rate of cure is shown in Table VI. In all cases, the rate of cure produced by the lower concentration of accelerator is considerably slower.

TABLE V—WATER-INSOLUBLE ACCELERATORS
GLASS PLATE VERSUS POROUS PLATE FILMS

Air Oven Cure (Min./°F.)	*Stress at 600% Elongation*	*Tensile Strength at Break*	*Elongation at Break*
COMPOUND 7—ACCELERATOR III—ZINC-DIBUTYL-DITHIOCARBAMATE—0.5 PART			
Glass Plate Films—Selected Cure: 60 minutes at 200°F.			
5/200	600	4650	1040
10/200	625	4950	1000
20/200	750	5150	980
30/200	775	5150	970
60/200	800	5125	960
Porous Plate Films—Selected Cure: 60 minutes at 200°F.			
5/200	525	3875	940
10/200	550	4375	960
20/200	575	4600	960
30/200	575	3950	930
60/200	675	4775	950
COMPOUND 8—ACCELERATOR IV—ZINC-DIETHYL-DITHIOCARBAMATE—0.5 PART			
Glass Plate Films—Selected Cure: 60 minutes at 200°F.			
5/200	325	1350	900
10/200	450	3325	980
20/200	625	4650	965
30/200	750	4825	950
60/200	900	5175	960
Porous Plate Films—Selected Cure: 60 minutes at 200°F.			
5/200	275	2500	960
10/200	425	3200	920
20/200	700	3800	870
30/200	775	4325	875
60/200	800	4675	860

TABLE VI—COMPARISON OF RATES OF CURE

Compounds	Accelerator Used	Selected Cure (Min./°F.) High Conc. Accel.	Low Conc. Accel.	Minutes low conc. is slower than high conc.
1 and 5	I	5/200	60/200	55
2 and 6	II	30/200	60/200	30
3 and 7	III	30/200	60/200	30
4 and 8	IV	30/200	60/200	30

TABLE VII—TENSILE STRENGTH RETAINED AFTER AGING SELECTED CURES 60 MINUTES IN AIR BOMB

Compound Number	Cure	Accelerator	Type of Film	Tensile Strength Original	Tensile Strength After Aging	% Tensile Strength Retained*	% Porous Plate Films Are Poorer Than Glass Plate Films
1	5/200	I	Glass Plate	5000	2825	56.5	....
1	5/200	I	Porous Plate	4950	1450	29.3	52.3
3	30/200	III	Glass Plate	5150	1900	36.9	....
3	30/200	III	Porous Plate	4775	875	19.2	52.0

*This figure obtained from the following relation:

$$\frac{\%\text{ Tensile Retained by Porous Plate Films}}{\%\text{ Tensile Retained by Glass Plate Films}} \times 100 = \%$$

Thus, it is practically certain that any appreciable loss of accelerator would have been revealed if there had been such a loss when a higher concentration of accelerator was used.

Aging

Quite often differences in vulcanizates are revealed more readily by other properties than the stress-strain properties of the freshly-cured stock. This possibility may be investigated by measuring the resistance to aging of films from compounds containing water-soluble accelerators. If porous plate films, which already have been shown to have the same rate of cure as glass plate films, from the compounds containing the water-soluble accelerators are less resistant to aging than the glass plate films, then an indication of accelerator loss from the porous plate films is given, unless it can be shown that the poorer aging is due to the nature of the porous plate films rather than accelerator loss.

In Table VII are shown the results obtained when films having the selected cure from compounds containing accelerators I and III were aged in the air bomb 60 minutes at 80 pounds air pressure and 260° F. Accelerators I and III were chosen for this test because they are salts of the same dithiocarbamic acid. Selected cures were aged because they represent the best cured samples.

The data in Table VII reveal that porous plate films from compound 1 containing accelerator I (water-soluble) age poorer than glass plate films from the same compound. That this poorer aging is not caused by accelerator loss, however, is shown by the fact that the porous plate films from compound 3 containing accelerator III (water-insoluble) also age poorer than glass plate films from the compound. Further, it is shown that the loss in resistance to aging of the porous plate films as compared with glass plate films is almost identical for both the water-soluble and water-insoluble accelerator, thus indicating more strongly that the poorer aging of the porous plate films is due to the nature of the films and not to accelerator loss.

These tests on the aging characteristics of films confirm the conclusion reached in the study of rate of cure that there is no loss of properties attributable to a loss of accelerator through water-solubility.

Conclusions

The data presented in this paper support the following conclusions:

Little, if any, accelerator is lost when rubber latex compounds containing water-soluble accelerators are applied to porous surfaces.

The indirect method of analysis used is sensitive enough to detect any appreciable loss of accelerator and would have detected any loss large enough to have practical importance.

The fact that films from a rubber latex compound made by casting on a porous plate have lower moduli and tensile strengths and are less resistant to aging than films made by casting on a glass plate is apparently due to the physical nature of the porous plate.

Light and Accelerated Light Aging of Rubber, Synthetic Rubber, and Rubber Substitutes

By T. A. WERKENTHIN and D. RICHARDSON, R. F. THORNLEY and R. E. MORRIS

(Concluded from the November, 1941, Issue)

ONE of the problems which remains clearly unsolved is a method of differentiation between the various grades of a synthetic which possess a marked resistance to the action of sunlight. In the case of Synthetic E, for example, samples have been exposed to the action of unfiltered or filtered radiation with no measurable deterioration in tensile strength. Invariably, however, in these instances, the lack of deterioration of tensile strength was concomitant with lack of any visual changes such as cracking or checking.

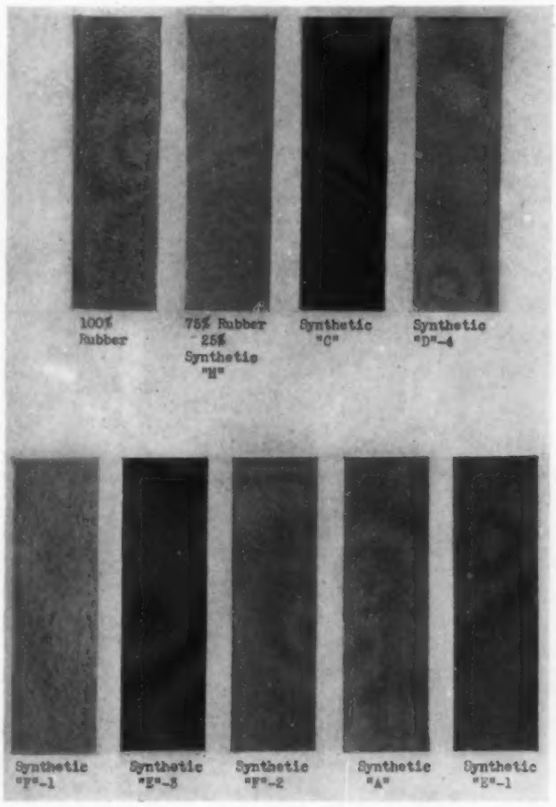


Fig. 7—Wire insulation stocks after 8 hours exposure at 20% elongation to unfiltered radiation from Eveready "U" carbon arc. Exposed side shown unless otherwise designated.

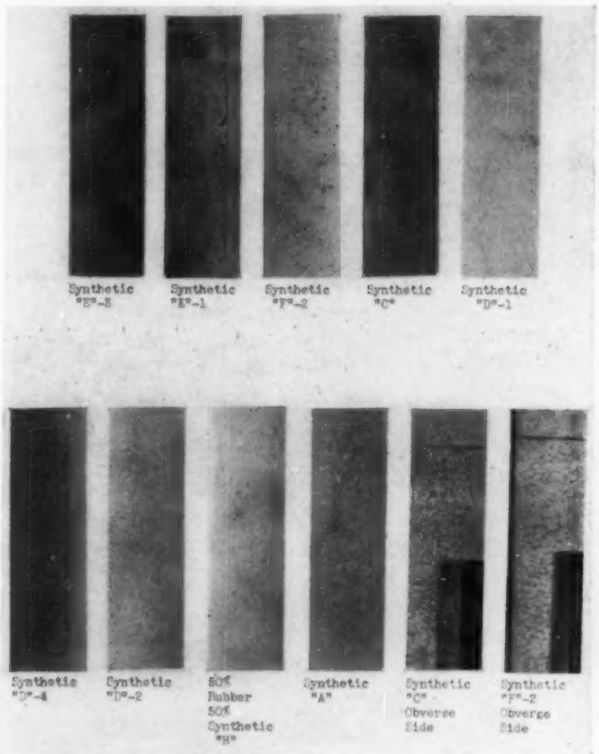


Fig. 8—Wire insulation stocks after 23 hours exposure at 20% elongation to unfiltered radiation from Eveready "U" carbon arc. Exposed side shown unless otherwise designated.

From a practical standpoint it may be assumed that if the material is sufficiently resistant to undergo long periods of exposure to unfiltered radiation of ultraviolet light, it appears unnecessary to determine exactly whether this will be equivalent to 3, 5 or 6 years of exposure under natural conditions of sunlight or weathering.

In an investigation of various wire insulation stocks made with Hevea rubber and several types of synthetic

EDITOR'S NOTE: A "key" to the identification of the various synthetic and substitute rubbers discussed in this article appeared in the November, 1941, issue.

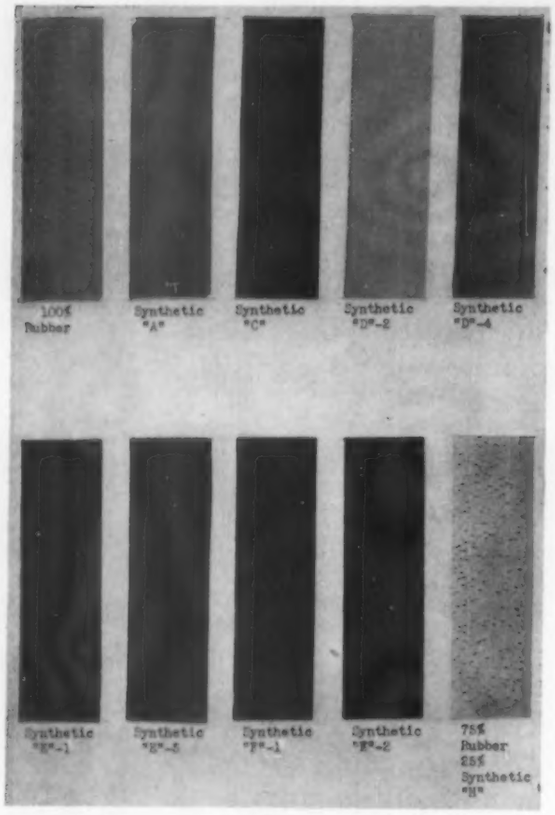


Fig. 9—Wire insulation stocks after 32 hours exposure at 20% elongation to unfiltered radiation from Eveready "Sunshine" carbon arc. Exposed side shown unless otherwise designated.

rubber and with blends of synthetic rubber and Hevea rubber, accelerated light aging tests were made. The results obtained are indicated in Figures 7, 8, 9, and 10, respectively. It has been determined that for certain Hevea rubber compounds, exposure tests made with unfiltered "U" carbon arcs and unfiltered "Sunshine" carbon arcs would give satisfactory correlation with natural sunlight. Tests were made using exposure to unfiltered irradiation in preference to irradiation using Corex-D filters for correspondingly longer periods of time. It was found necessary to remove certain of the materials after comparatively short periods of exposure because they cracked so badly that further exposure would have prevented making tensile test determinations. A tabulation of the results obtained with the various types of materials is indicated in Table 6. Except for wire insulation stocks made with natural rubber the greatest deterioration was found with blends of rubber and Synthetic H and with stocks made with Synthetic F-4. In some instances, the deterioration in tensile strength varied from the original tensile strength by as much as 80 per cent.

As may be seen from the above-mentioned table, only one of the synthetics, that is, Synthetic E, showed a slight increase in tensile strength after exposure for 8 and 24 hours, and even after exposure to 32 and 56 hours. The behavior of this synthetic corresponds generally to the behavior indicated when this material is exposed to natural sunlight. It will be noted that in these tables the modulus of 200 per cent elongation was also recorded. The tests made using this additional criterion have not been sufficiently large in number to warrant definite interpretation of the significance.

Referring to Figures 7, 8, 9, and 10, attention is called to the condition of cracking on the obverse side, some of them quite severely, with concomitant deterioration in tensile strength. It is noteworthy that when synthetics were compounded as soft gasket stocks instead of as rubber insulation stocks, that the light aging properties of Synthetic H, for example, or of blends of Synthetic H with rubber, were appreciably better than soft rubber stocks compounded with Hevea rubber alone.

Tests were carried out to determine the difference in resistance to light aging of a medium-soft rubber gasket material as regularly furnished by rubber manufacturers under Navy Department Specification 33-R-4a of December 2, 1935, compared to gasket material deliberately compounded to improve its sunlight resistance. These preliminary tests were inconclusive because neither the ordinary rubber compound nor the stocks compounded with certain additives were sufficiently resistant to ultra-violet light aging or to sunlight aging. It was determined that rupture sometimes occurs at the spot where the rubber is clamped in the holder. This difficulty can be overcome by inserting a small piece of canvas duck next to the clamp. Since this type of gasket material when used under conditions where it is exposed to weathering and sunlight, as for example in airplane gaskets, is not normally stretched, the question arises as to whether 20 per cent elongation during exposure, or any elongation for that matter, is desirable.

In order to check the effect of elongation on rate of deterioration of rubber specimens exposed to light, specimens of a pure gum, soft gasket stock, were stretched 10 per cent and exposed to natural sunlight.

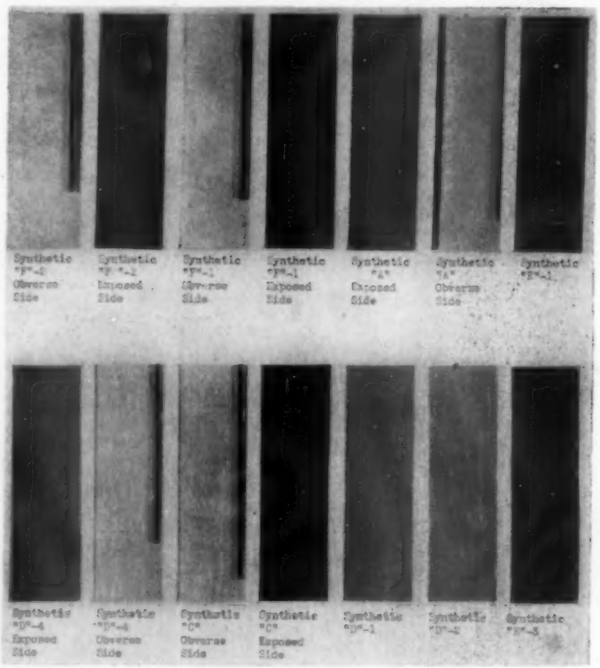


Fig. 10—Wire insulation stocks after 56 hours exposure at 20% elongation to unfiltered radiation from Eveready "Sunshine" carbon arc. Exposed side shown unless otherwise designated.

Table VI—Properties of Wire Insulation Stocks

No.	Type of Rubber	Tensile Strength Per Square Inch	Ultimate Elongation—Per Cent	Modulus at 200% Elongation—p.s.i.	Permanent Set in 2 Inches	Specific Gravity	Crescent Tear, Lbs. per 0.1-in. Thickness	Hardness (Specimen ¼-in. Thick)	Relative Abrasion Resistance (Based on Rubber Stock as 100.0): DuPont Abrader, Volume Loss per Horsepower Hour	DuPont Abrader, Volume Loss per Hour	Bureau of Standards Abrader, Revolutions per 0.1-inch Wear	Bureau of Standards Abrader, Volume Loss per 100 Revolutions
1	100% Natural Rubber (Smoked Sheet)	3110	620	380	0.05	1.64	36.4	45	100.0	100.0	100.0	100.0
2	75% Natural Rubber 25% Synthetic H	1910	550	380	.08	1.64	21.0	45	79.7	81.5	73.6	74.4
3	50% Natural Rubber 50% Synthetic H	1090	530	350	.13	1.65	11.1	43	58.1	57.6	47.2	43.3
4	Synthetic E-3	1620	940	180	.08	1.91	15.4	35	91.7	91.2	47.7	51.7
5	Synthetic E-1	1300	830	300	.06	1.95	11.2	48	160.8	154.8	67.6	68.4
6	Synthetic A	1670	700	120	.09	1.53	5.4	33	150.6	135.6	94.9	97.8
7	Synthetic D-1	770	510	480	.06	2.28	18.3	64	60.5	93.2	36.5	37.6
8	Synthetic D-2	760	550	430	.07	2.27	15.4	60	49.9	79.9	28.7	36.1
9	Synthetic D-4	2080	570	190	.05	1.58	8.6	41	267.5	318.4	72.7	73.9
10	Synthetic "C"	900	770	100	.08	1.59	6.1	33	97.1	120.7	79.3	79.2
11	Synthetic F-1	1300	690	150	.05	1.51	5.3	37	176.3	170.8	81.0	80.2
12	Synthetic F-2	650	720	100	.06	1.49	3.8	31	133.2	170.0	95.9	97.1
Bureau of Ships Spec'n 15CI 40% Rubber Insulation (INT)		1500 min.	450 min.	—	.25 max.	1.61 min.	—	—	—	—	—	—

After Exposure at 20% Elongation to Unfiltered Radiation from "U" Carbon Arc in Eveready Irradiating Unit

No.	Type of Rubber	After 8 Hours Exposure: Tensile Strength Per Square Inch	Change from Initial Tensile (%)	Ultimate Elongation (%)	Change from Initial Elongation (%)	Modulus at 200% Elongation (p.s.i.)	Change from Initial Modulus (%)	After 24 Hours Exposure: Tensile Strength Per Square Inch	Change from Initial Tensile (%)	Ultimate Elongation (%)	Change from Initial Elongation (%)	Modulus at 200% Elongation (p.s.i.)	Change from Initial Modulus (%)
1	100% Natural Rubber (Smoked Sheet)	2010	—35	520	—16	410	+11	—	—	—	—	—	—
2	75% Natural Rubber 25% Synthetic H	1560	—21	480	—16	420	+ 8	—	—	—	—	—	—
3	50% Natural Rubber 50% Synthetic H	—	—	—	—	—	—	990	—12	480	—16	350	+17
4	Synthetic E-3	1650	— 5	950	— 7	170	+ 6	1710	— 2	970	— 5	180	+13
5	Synthetic E-1	1340	+ 3	790	— 5	320	+ 7	1400	+ 8	760	— 8	390	+30
6	Synthetic A	1370	—18	700	0	100	—17	730	—56	610	—13	130	+ 8
7	Synthetic D-1	—	—	—	—	—	—	760	— 6	480	0	320	—32
8	Synthetic D-2	—	—	—	—	—	—	650	—13	520	—15	400	— 3
9	Synthetic D-4	1670	—20	520	— 9	340	+79	1140	—45	480	—16	220	+16
10	Synthetic "C"	510	—43	620	—19	140	+40	450	—50	520	—32	170	+70
11	Synthetic F-1	310	—76	440	—36	150	0	—	—	—	—	—	—
12	Synthetic F-2	330	—49	540	—25	80	—20	240	—63	420	—42	100	0

After Exposure at 20% Elongation to Unfiltered Radiation from "Sunshine" Carbon Arc in Eveready Irradiating Unit

No.	Type of Rubber	After 32 Hours Exposure: Tensile Strength Per Square Inch	Change from Initial Tensile (%)	Ultimate Elongation (%)	Change from Initial Elongation (%)	Modulus at 200% Elongation (p.s.i.)	Change from Initial Modulus (%)	After 56 Hours Exposure: Tensile Strength Per Square Inch	Change from Initial Tensile (%)	Ultimate Elongation (%)	Change from Initial Elongation (%)	Modulus at 200% Elongation (p.s.i.)	Change from Initial Modulus (%)
1	100% Natural Rubber (Smoked Sheet)	2230	—25	530	—15	430	+13	—	—	—	—	—	—
2	75% Natural Rubber 25% Synthetic H	1260	—36	440	—23	420	+ 8	—	—	—	—	—	—
3	50% Natural Rubber 50% Synthetic H	—	—	—	—	—	—	950	—15	520	— 9	290	— 3
4	Synthetic E-3	1870	+ 7	930	— 9	220	+37	1780	— 2	940	— 8	180	+13
5	Synthetic E-1	—	—	—	—	—	—	1480	+14	710	—15	480	+60
6	Synthetic A	1390	—17	650	— 7	100	—17	960	—43	610	—13	100	—17
7	Synthetic D-1	—	—	—	—	—	—	720	—10	540	+13	430	— 9
8	Synthetic D-2	710	— 5	580	— 5	420	+ 2	700	— 7	580	— 5	420	+ 2
9	Synthetic D-4	1620	—22	480	—16	360	+90	1240	—40	450	—21	250	+32
10	Synthetic "C"	660	—38	580	—25	170	+70	520	—42	530	—31	180	+80
11	Synthetic F-1	260	—80	400	—42	130	—13	230	—82	370	—46	150	0
12	Synthetic F-2	250	—62	440	—39	120	+20	210	—68	400	—44	100	0

TABLE VII—EFFECT OF DEGREE OF ELONGATION DURING LIGHT EXPOSURE

		Elongation of Specimen during Exposure	
		10%	20%
Initial	Tensile Strength.....	3090 p.s.i.	3090 p.s.i.
	Ultimate Elongation.....	740%	740%
After 16 Days	Tensile Strength.....	1520 p.s.i.	1610 p.s.i.
	Change from Initial Tensile Strength.....	—50.8%	—47.9%
	Ultimate Elongation.....	630%	660%
	Change from Initial Elongation	—14.8%	—10.8%
After 23 Days	Tensile Strength.....	1360 p.s.i.	1560 p.s.i.
	Change from Initial Tensile Strength.....	—56.0%	—49.5%
	Ultimate Elongation.....	630%	650%
	Change from Initial Elongation	—14.8%	—12.2%
After 28 Days	Tensile Strength.....	1230 p.s.i.	1420 p.s.i.
	Change from Initial Tensile Strength.....	—60.2%	—54.0%
	Ultimate Elongation.....	630%	650%
	Change from Initial Elongation	—14.8%	—12.2%

Likewise, specimens of this material were stretched 20 per cent and exposed alongside the first group. The plane of all stretched specimens was 45 degrees from the vertical facing south. The data of tensile test and elongation are given in Table 7. The results of this experiment indicate that for this type of compound the rate of deterioration of rubber by light is not necessarily augmented by an increase in elongation of the exposed specimen.

One of the important requirements for soft rubber gasket material of this type is that it shall have a low compression set and low modulus of elasticity. The use of sunlight resistant synthetics for this type of gasket material has been limited as it has been found to be difficult to compound these synthetics to give a gasket of the desired Shore hardness and at the same time have sufficiently low compression set and low modulus of elasticity. Solution of this one problem alone would adequately compensate within a few months' time all work which has been done in regard to ultra-violet light aging of rubber and synthetics.

A typical example of correlation of service behavior with light and oxygen bomb aging tests may be of interest. The effects of oxygen bomb aging and accelerated light aging on two matting stocks were investigated before starting a service test. The accelerated light aging tests were performed in the Eveready Irradiating Unit. One test was carried out with unfiltered radiation from the "U" carbon arc. The second test employed the same carbon arc but the radiation was filtered through Corex-D glass panels.

The preparation of tensile test specimens from the mattings used in the service test required buffing off the pyramid designs. Thus, the rubber surfaces which had been exposed to sunlight were removed in preparing the specimens and the tensile tests were performed on rubber from the interior of the mattings. The preparation of test specimens for oxygen bomb aging and accelerated light aging also required buffing off the pyramid designs, but the aging tests were performed on the buffed specimens so that light or oxygen acted directly on the surface of the rubber to be tested.

The test data are given in Table 8. It will be noted that the correlation between the results of the natural aging test and the results of the accelerated light aging test using unfiltered "U" carbon radiation was surprisingly good. The results of the accelerated light aging test using filtered "U" carbon radiation did not agree so closely with the natural aging test values, and the results of the oxygen bomb aging test were far off; in fact, the latter test rated the aging resistance of the matting stocks in the reverse order from the rating given by the natural aging test.

Results obtained indicate that comparatively satisfactory differentiation may be made between relative sunlight and weathering resistance of Hevea rubber compounds. Similarly, evaluation of synthetic compounds has been carried to a degree where satisfactory and unsatisfactory resistance may be determined. It is felt that additional work in connection with the correlation of sunlight and artificial light will have to be carried out before accurate prediction as to weathering resistance in exact time equivalents may be made, provided that the susceptibility of the material is known.

It is desired to emphasize here that results obtained with rubber may not be directly translated or transmitted to results obtained with one of the synthetics. Neither may the results obtained with one type of synthetic be arbitrarily applied to another synthetic because, as indicated above, these results may be entirely different and in a contrary direction.

TABLE VIII—PROPERTIES OF DECK MATTING STOCKS

Matting	Construction of Matting	Initial Properties: Tensile Strength, p.s.i.	Initial Properties: Ultimate Elongation, %	Properties after One Year's Service Exposure To Weather and Light: Tensile Strength, p.s.i.	Change from Initial Tensile, %	Ultimate Elongation, %	Change from Initial Elongation, %
A	Fabric Insert and Fabric Backing	530	220	320	—40	100	—55
B	Fabric Backing	1540	420	1310	—15	340	—19

Manufacturer of Matting	Change in Properties after 96 hrs. at 158° F. under 300 p.s.i. Oxygen Pressure: Change from Initial Tensile, %	Change from Initial Elongation, %	Change in Properties after 4 hrs. Exposure at 20% Elong. to Unfiltered "U" Carbon Rad.: Change from Initial Tensile, %	Change from Initial Elongation, %	Change in Properties after 560 hrs. Exposure at 20% Elong. to Filtered "U" Carbon Rad.: Change from Initial Tensile, %	Change from Initial Elongation, %
A	—20	....	—38	—32	—21	—32
B	—37	....	— 5	—14	—17	—29

Electrical Properties of Conductive Rubber

Including a Recommended Method of Test for Determining Electrical Conductivity of Rubber

At the Forty-Fifth Annual Meeting of the National Fire Protection Association, held in Toronto, Canada, May 12-16, 1941, a report was submitted by the Association's Committee on Gases. This report contained recommendations concerning the adoption of electrically conductive rubber in the manufacture of various products exposed to electrostatic hazards, such as those which exist in operating rooms. An appendix to the report provided a standard method for testing the electrical conductivity of rubber. The complete report of the Committee on Gases has been tentatively adopted by the N.F.P.A. for the next year. That portion of the report dealing with the testing of rubber to determine its electrical conductivity, a subject which is receiving much attention these days, is reproduced.

THE electrical properties of conductive rubber can not be expressed completely in terms of the specific resistance alone. Determinations based on the measured resistance, R, of a homogeneous sample of the rubber placed between metallic electrodes, when substituted into the equation for the specified resistance

$$\rho = R\frac{A}{l} \qquad (1)$$

give results which vary between very wide limits for different values of the cross-sectional area, A, perpendicular to the lines of current flow, and of the length, l, of the conductive path parallel to the lines of current flow. From the nature of the relation between the observed results and the magnitudes of A and of l, it appears that there is a resistance of considerable magnitude at the boundary between the metallic electrode and the conductive rubber. That such a high contact resistance does, indeed, exist may be verified by simple experiments. It becomes essential, therefore, in order to describe or to specify adequately the performance of conductive rubber, to be able to evaluate separately both this contact resistance and the internal, or inherent, resistivity of the material.

The internal resistivity may be determined directly by conventional methods. A known current, sent through a sample of the conductive rubber between current electrodes making contact with its surface at the ends of a strip having uniform cross section perpendicular to the lines of current flow, causes a potential drop along a given length which is proportional to the internal resistance of that length of the sample. This potential drop may be measured by electrodes placed on the surface between the current electrodes and making contact along lines at right angles to the lines of current flow. The arrangement of the circuits for this measurement are shown in Fig. 1.

By using a potentiometer, which, at the balance point, permits no current to flow through the potential electrodes, the existence of any contact resistance between these electrodes and the material is without effect on the determination. The ratio of the measured potential drop to the known current is, in this case, the true internal resistance of the length of the sample between the potential electrodes. The *internal resistivity*, ρ, in ohms per unit cube, is then obtained by multiplying the resistance thus computed by the ratio of the cross-sectional area, A, of the sample at right angles to the lines of current flow to the length, l, of the sample between the potential electrodes, as in equation (1).

Unfortunately no such simple method is available for the determination of the contact resistance. If we were justified in assuming that the internal resistance was independent of the orientation of the material we might compute the contact resistance for both faces

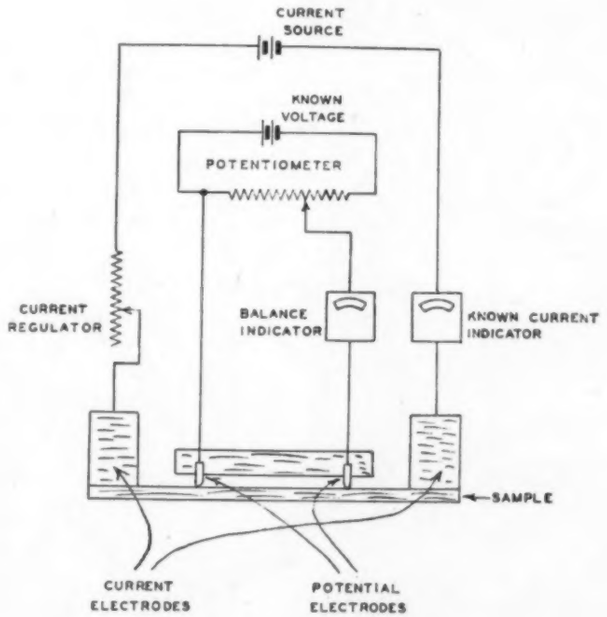


FIG. 1.

as the difference between the total resistance between electrodes placed on opposite faces and the internal resistance of the material between these faces. This would involve determining the internal resistivity for a rectangular parallelepiped of the material by the method just described and then measuring the total resistance between electrodes placed on opposite faces. The lines of current flow in these two cases, are, however, at right angles to each other and there is no assurance that the internal resistivity determined for one case is correct for the other.

The contact resistance can, however, be determined indirectly from measurements made with a single arrangement of four electrodes on a homogeneous sample of the material having the form of a rectangular parallelepiped. Let a current electrode be placed in contact with one surface of this rectangular parallelepiped at one end, covering the surface for a distance, D, from the end. Let the inner edge of the electrode make contract with the surface along a line perpendicular to the lines of current flow as current passes from this electrode to a similar electrode similarly placed at the other end of the sample. Both electrodes should be in contact with one surface of the test piece, as shown in Fig. 1, and the lines of current flow in the main body of the material should be parallel to this surface. The resistance between one metallic electrode and a plane through its inner edge, perpendicular to the lines of current flow, depends both on the contact resistance between the electrode and the conductive material and on the internal resistance of the material. This follows from the fact that current entering the sample at a distance from the inner edge of the electrode must pass first through the contact resistance of a narrow strip parallel to the edge and then through the internal resistance of the length between this strip and the edge.

The whole sample may, in fact, be considered as an electrical network, as shown in Fig. 2, made up of many very small current paths, the resistance of some being due to the contact effect at the surface and of others to the internal resistance of the material. This contact resistance may be expressed as g, the surface conductance in mhos per unit length of sample parallel to the line of current flow. This internal resistance may be expressed as r, the resistance in ohms per unit length of sample parallel to the lines of current flow. This latter value may be determined as previously described.

TABLE 1

Electrode length—2 cm.

Values of rg	Values of R/r	Values of rg	Values of R/r
0.0006	833.	0.40	1.86
0.0010	500.	0.60	1.41
0.0015	334.	1.0	1.04
0.0025	201.	1.5	0.829
0.0040	125.	2.5	0.634
0.0060	84.0	4.0	0.501
0.010	50.7	6.0	0.408
0.015	33.9	10.	0.316
0.025	20.6	15.	0.258
0.040	13.2	25.	0.200
0.060	9.00	40.	0.158
0.10	5.63	60.	0.129
0.15	3.96	100.	0.100
0.25	2.63		

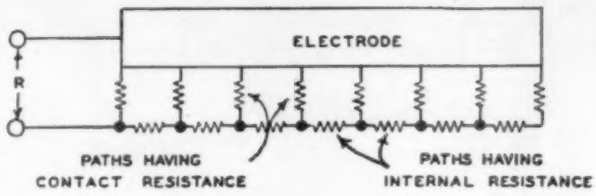


FIG. 2.

The effective resistance between the electrodes and planes through their inner edges may be determined by measuring the total resistance between the two electrodes and subtracting the resistance, due to that portion of the sample included between the planes. The total resistance, Rr, between the electrodes may be determined, by means of the circuits shown in Fig. 1, by transferring the connections of the potentiometer to the current electrodes and measuring the total potential drop in the same manner as that used for determining the internal resistance. The resistance of the material between the two inner edges of the electrodes and parallel to the lines of current flow may be computed as the product of the resistance per unit length, r, and the distance, D, between these inner edges. The resistance, R, under a single electrode may be considered as being ½ of the electrode resistance. In other words,

$$R = \frac{R_T - rD}{2} \qquad (2)$$

We, therefore, have a value for R, the resistance between one electrode and the plane through its inner edge, and a value for r, the internal resistance per unit length of the sample. The problem now is to determine the value of g, the surface conductance per unit length.

It is difficult to express g explicitly in terms of the two known resistance values. It is possible, however, to compute values of the ratio R/r for a number of assumed values of the product rg, taking into account the length of the particular electrode used in the measurements, measured parallel to the lines of current flow. These values may be plotted against each other, preferably on logarithmic graph paper. We may, therefore, compute the ratio R/r from the available data, look up the corresponding value of rg on the chart, and divide the latter by the known value of r to obtain the desired value of g. From this we may obtain the *surface conductivity* G, in mhos per unit area, by dividing g by the width of the sample.

Representative values for the two quantities, R/r and rg, are given in Table 1. In computing these values the length of the electrode parallel to the lines of current flow was assumed to be 2 cm.

In practice it has been found convenient to use a test piece 10 cm. long and 2 cm. wide cut from a sheet sample of the material. Grease and other foreign matter should be removed from the surface by wiping lightly with a cloth moistened with acetone. Suitable current electrodes may be made from blocks of brass 2 cm. wide and weighing 400 gm. each. Placed one on each end of the strip, they extend in for 2 cm., cover an area of 4 sq. cm. each, and exert a pressure of 100 gm. per sq. cm. The potential electrodes may be bars of brass 1/16 in. thick set parallel to each other in slots in a block of non-conductive material so that they

are maintained at a fixed separation of 10 cm. The general arrangement of electrodes and sample is shown in Fig. 1. Accuracy in placing the electrodes may be insured by extending them over the sides of the sample and locating them by means of pins fixed in a non-conducting base.

The electrical connections are shown diagrammatically in Fig. 1. All readings of voltage magnitudes are made by means of a calibrated scale on the potentiometer.

For conductive materials in the form of thin sheeting, particularly when such sheeting is not homogeneous but contains a fabric or other non-conductive insert, the resistance effective to current flowing longitudinally through the sheeting, *i.e.*, parallel to the surface, is particularly significant. This property may be evaluated most conveniently in terms of the resistance of a portion one centimeter long of a strip of the sheeting one centimeter wide. This may be termed the *longitudinal resistivity* of the material. Like the internal resistivity, it must be evaluated independently of any surface contact effects. Its value may be obtained quantitatively by multiplying r by the width of the sample, in the same way that surface conductivity was obtained from g by dividing by the width. Although there is no conventional unit for this property, numerical values may be expressed in terms of ohms per centimeter square.

Electronic Tornado Welds Seam Near Rubber "Gland"

ELECTRIC arc welding is done at an arc temperature of approximately 7000 degrees Fahrenheit, but properly controlled, work can be done on steel adjacent to soft materials which would be destroyed or injured by excessive heat. Such a problem was solved by engineers for the General Tire and Rubber Company of Akron, Ohio, in the construction of Airflex couplings, which are used to link motor to machinery.

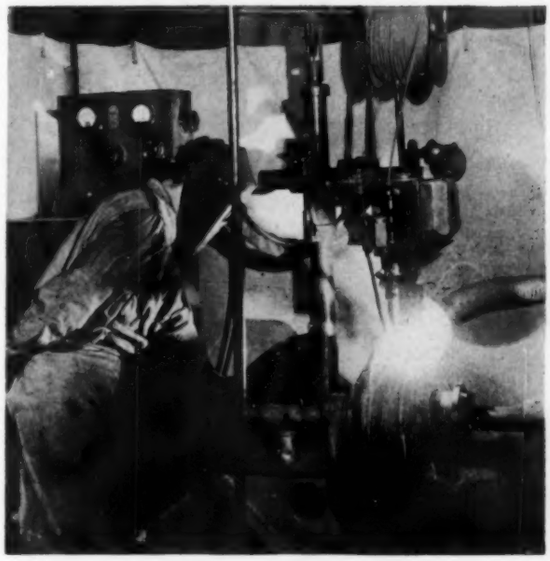
These devices employ a special rubber tire-like "gland" which surrounds an inner cylinder and is bolted to an outer cylinder. The driving thus is done through the gland and this absorbs sudden changes in torque or load.

The rim of the outer cylinder is arc welded by an automatic carbon arc "Electronic Tornado" welding machine supplied by the Lincoln Electric Company, Cleveland, Ohio, as shown in the illustration, while the cylinder is revolved at a timed rate.

The seam being welded in some sizes of coupling is less than an inch away from the heat-sensitive rubber gland. The concern cools the outer rim during welding by means of a spray arrangement. As shown in the picture, a string of flux is fed into the arc created by the carbon electrode, but the concern uses no filler wire.

By means of interchangeable fixtures the Lincoln welding head is used on 10 sizes of couplings, from 9-7/16 inches in diameter up to 28⅞ inches in diameter. Convenient stops on the arm alleviate the necessity of adjusting the head each time. Before welding, the molded coupling and plate are air chucked and the welding head swung into place.

The 9-7/16-inch diameter coupling is welded in 1.40 minutes and the 28-⅞-inch diameter coupling is welded on the "Electronic Tornado" machine in 5.70 minutes. The average amperage used ranges from 340 to 450 amperes and the arc volts from 21 to 27. The depth of penetration varies between 3/16 and ¼-inch. The concern sometimes substitutes paste for the string flux.



"Electronic Tornado" automatic arc welder in operation at the General Tire plant.

Blaw-Knox Co., Pittsburgh, has developed a new agitator, called the **Rotoflo Agitator,** suitable for agitation or contacting liquid and liquid, liquid and solid, or liquid and gas. It consists of a jacketed shell designed for Dowtherm heating, a high efficiency rotor driven by motoreducer, and special surf-riding baffles.

•

Elimination of ground clamp failure is one of several features claimed for the new **Twistite Ground Clamp** introduced by the Michigan Clamp Co., Jackson, Mich. Positive protection against "welding splatter" is also claimed.

•

A new, completely **motorized roll grab** has been developed by the Cleveland Tramrail Division of the Cleveland Crane & Engineering Co., Wickliffe, Ohio, for use with its overhead materials handling systems. The grab will handle rolls from 16 inch minimum to 60 inch maximum diameter.

Editorials . . . . . .

War in the Pacific

LONG anticipated and long feared by the domestic rubber manufacturing industry, war involving the United States has broken out in the Pacific. That Japan will be made to pay, and to pay dearly, for her outrageous actions which have given her a temporary advantage, is the solemn vow made by every American citizen. Japan's naval and air power is not being underestimated, but her inability to withstand a long and harrowing war against the military and industrial might of the United States spells her eventual doom and destruction for all times as a world power. This time there shall be no Versailles Treaty.

War in the Pacific must have an immediate effect on the domestic rubber industry. Time must be allowed to enable official circles to carefully study and survey the situation. Plans must be put into effect to bridge the gap between the temporary stoppage of crude rubber shipments from the East and the resumption of such shipments. Every rubber manufacturer in the country has an obligation to fulfill and his first duty is to observe every requirement laid down by Washington, no matter how much it may hurt. It will be a temporary "wound" which will later be cured. Rubber manufacturers—large and small—will be called on to produce products vital to the war effort. Civilian products will have to be curtailed.

Official Washington has already made its first moves. As this is being written (December 11) the Director of Priorities has already issued an order which, in effect, states: (1) Processors may not consume or process any rubber except for preference rating orders carrying an A-3 rating or higher and for certain other excepted uses; (2) Rubber may not be processed for the excepted uses at rates during December and later months greater than the rate of consumption in November, provided that this does not apply to purchase orders with ratings of A-3 or higher. A list of excepted uses can be secured from the Office of Production Management.

The order goes further. It prohibits the sale of all new automobile tires except for top defense orders for the period December 11 to December 21. Not only manufacturers are prohibited from the sale of such tires, but dealers, service stations, mail order houses—any wholesale or retail outlet handling tires. This action is designed to stop the consumer buying wave which broke out shortly after Japan had declared war. Such buying waves are conducive to inflation.

In addition to this official order, there are reports from Washington—not to be accepted as literal truth until officially confirmed—that a two-week "holiday" on all rubber manufacturing activities may soon be declared to enable the O.P.M. to take stock of the situation. Tire manufacturers, it is believed, will be prohibited from the manufacture of passenger car and light truck tires, thus sharply cutting rubber consumption. Drastic curtailment in the manufacture of non-defense items, threatened prior to the outbreak of war, is a foregone conclusion.

But, as intimated above, these are emergency steps taken of necessity in the heat of opening warfare. As much crude rubber as possible must be retained and be earmarked for pure defense work. We now have on hand approximately a full year's supply. By earmarking this supply solely for defense work, it can be stretched to two and one half years. In half of that time the synthetic rubber plants now being expanded and under construction will be capable of producing from 80,000 to 100,000 tons annually. We have not yet tapped our full capacity for producing reclaim. The United States does not face the probability of acute lack of rubber supplies.

And during these months, and perhaps years, to come, crude rubber supplies will continue to reach the United States. Although shipments from the East may cease completely for a short period, they will be resumed. Despite Japan's naval strength American ships will get through. The Merchant Marine is already transferring freighters to the Pacific run. Bear in mind the fact that our armed forces in the East—and those of England—must be supplied with basic war materials, and ships bearing such materials, probably convoyed by American war vessels, will not return empty-handed. They will bring back rubber and tin and other valuable commodities from the East. Not all of these freighters will get through the war zone, but most of them will and the rubber they bring will abet any dwindling stocks on hand.

The domestic rubber manufacturing industry, like many an other industry, faces a few dark days ahead. But, as we have cautioned before, these are days when the rubber manufacturer must keep his poise, disregard the wild and wooly rumors which will fly thick and fast, and await official announcements from Washington. We are at war—not only with Japan, but with Germany and Italy and their axis satellites—and the few must be sacrificed for the good of all. These are truly times to task man's soul, but America has been challenged and Americans will see it through.

CURRENT NEWS OF THE MONTH

DRASTIC CUT IN ALLOTMENTS EXPECTED AS WAR BREAKS IN THE PACIFIC; WILLARD HELBURN SUCCEEDS BARTON MURRAY AS RUBBER DIVISION CHIEF

WAR has finally broken out in the Pacific. Japan's unwarranted and unreasonable action on December 7—for which she will have to pay full penalty in the long run—places an entirely different complexion on the commodities picture and, of course, will have an immediate reaction on the rubber industry. There is little doubt, although this article is being written only two days after the outbreak of hostilities, that allotments of crude rubber to the industry for the early part of 1942 will be sharply curtailed, with increased allotments granted to defense work and drastic curtailments made to manufacturers engaged in the production of non-defense items. There has, however, been no official action in this respect as yet, but based on activities in Washington during the past few weeks insofar as the rubber picture is concerned, such action is almost a foregone conclusion.

Late in November the Rubber Industry Advisory Committee met in Washington with officials of the O.P.M.'s rubber division to discuss rationing in 1942. It was immediately apparent that O.P.M. officials were sharply at variance over 1942 allocations, with one group holding out for drastic reductions for the purpose of amassing a greater reserve supply of emergency rubber. Barton Murray, chief of the rubber division at the time, held out for what he termed "satisfactory" allotments.

Two Significant Developments

Two significant developments resulted from the meetings: (1) It was revealed that a plan was being formulated to change the basic period for computing allotments; (2) The industry was advised to consider a plan for setting aside a part of their quotas for defense work, with the O.P.M. committed to find contracts to consume this apportionment, irrespective of the type of rubber products being produced.

How sharply divided O.P.M. officials were over the rubber allotment question for 1942 was revealed on November 26 when Mr. Murray tendered his resignation as Chief of the Rubber and Rubber Products Branch of the Division of Civilian Supply. Although Mr. Murray's resignation was attributed to "pressure of personal affairs" it is known that he resigned in protest against the drastic curtailment preferred by his superiors.

At the time of his resignation Mr. Murray said: "I have turned in my resignation and will not come back unless something drastic happens. I must be given responsibility and authority in the same package. When things not in the best interest of the industry are done, I don't want to get the blame as chief of the rubber division."

On December 5, Joseph L. Weiner, deputy director of the Division of Civilian Supply, announced that Willard Helburn, of Cambridge, Mass., had been appointed as Chief of the Rubber and Rubber Products Branch, succeeding Mr. Murray. Mr. Helburn is president of Willard Helburn, Inc., a leather manufacturing company of Peabody, Mass. He was graduated from Harvard University in 1904 in the same class with President Roosevelt. Last August he was "loaned" to the government to organize a hide and leather products section of the old Office of Price Administration and Civilian Supply, and since the Division of Civilian Supply was created in the O.P.M. he has been serving as a civilian allocation specialist assigned to the Textiles, Clothing and Equipage Branch of the Division of Purchases.

Distribution Reports Requested

On November 12, following constant prodding by the United Rubber Workers of America, the O.P.M. acted to determine whether rubber was being equitably distributed among plants throughout the country. The Director of Priorities, on that date, ordered rubber processors operating plants in more than one community to file reports within 15 days on distribution among individual plants during July, including rubber released by the Rubber Reserve Company.

If the ratio of distribution in subsequent months differed materially, the processors were required to submit full reports showing clearly the reasons for the change. "In any case in which it appears that such change in ratio was not justified or proper," the order stated, "the Office of Production Management will take such action as it may deem appropriate." No further word along these lines has been made to date. The purpose behind the order was to prevent severe labor displacement in any single community.

An increase in the December allotment of crude rubber to the rubber manufacturing industry to a total of 54,400 tons was announced by Leon Henderson, director of the Division of Civilian Supply, on December 6. The new figure is approximately 4,400 tons over the amount previously announced for the month and is virtually the same as that permitted in November.

In boosting the December quota, Mr. Henderson yielded to the urging of Sidney Hillman, chief of the O.P.M. labor division, and Barton Murray, resigned chief of the rubber division. The action came on the day that Willard Helburn, who succeeded Mr. Murray, took office. An appeal to increase the December rubber quota was previously made to Mr. Henderson by the U.R.W.A.

Late News Flash

Just as this issue went to press word was received from Washington to the effect that the Office of Production Management may declare a two-week "holiday" on the production of all rubber products, including tires and tubes, in order to give that office an opportunity to make a quick survey of the entire rubber situation in view of the new demands which will be placed on the industry due to hostilities in the Pacific.

It is also understood that the O.P.M. will shortly issue an order, if it has not already done so, ordering tire manufacturers to discontinue immediately the manufacture of all passenger automobile tires and light truck tires. Production of medium and heavy truck tires may be authorized, with some restrictions.

William Batt, director of the O.P.M.'s Division of Materials, has ordered all commodity branches, including rubber, to make an immediate survey with a view toward requisitioning all supplies, including those in the hands of industrial users. Steps may be taken, it was intimated, to "freeze" all supplies of crude rubber and earmark them entirely for defense orders.

It must be emphasized that some of these reports emanating from Washington are strictly rumors without official confirmation and rubber manufacturers are urged to await official actions before determining future marketing and production schedules.

NEW PRODUCTS AND PROCESSES FEATURED AT CHEMICAL SHOW

Several new products and processes were introduced to the chemical process industries at the 18th Exposition of Chemical Industries held at the Grand Central Palace in New York City from December 1 to 6. In all, more than 500 processes, synthetic products and chemicals, in addition to machinery and equipment, many of them of vital importance to the defense program, were displayed. The exposition featured 335 exhibits on three separate floors, many of them in motion or illuminated so as to show actual processes.

Included among the new products on exhibit was Neoseal, a new rubber compound which comes in calendered sheets adhered to oil paper, displayed by the U. S. Stoneware Co. This new product has many interesting uses since it shows excellent resistance to non-oxidizing acids and alkalis. It may be used as a membrane behind acid-proof linings or as a caulking material for bell and spigot pipe lines carrying corrosive fluids. Neoseal readily joins to itself and thus it is possible to tamp into a pipe bell the equivalent to a solid rubber ring.

Synthetic Rubbers on Display

The exhibit of the American Chemical Society, always an interesting feature of these expositions, was devoted to strategic raw materials of importance to defense efforts. Included in this exhibit were displays of several of the commercially available synthetic rubbers, in both raw and molded form, such as neoprene, Hycar, Ameripol, Thiokol and Butyl Rubber. The various bunas were also shown. Vistanex, sold by the Advance Solvents & Chemical Co., and Synthetic 100, sold by Moore & Munger, both polybutenes, were displayed in this group as rubber-like materials.

Several rubber manufacturers displayed their wares at the show. The American Hard Rubber Co. and the Luzerne Rubber Co. both displayed wide varieties of molded rubber goods specially designed for the chemical industry. Stanzoil Neoprene Gloves were shown by the Pioneer Rubber Co. Protective Coatings, Inc., displayed its complete line of coating materials, as well as a variety of rubber-coated products. The Garlock Packing Co. exhibited various small molded rubber parts. Respirators, gas masks and other safety products incorporating rubber were shown by the Mine Safety Appliances Co. Rubber proofed goods were included in the lines on display in the Atlas Powder Co. booth. Latex adhesives formed part of the exhibit in the booth of the Casein Company of America.

A variety of testing and control instruments, most of them featuring general application and a few designed especially for the rubber industry, was displayed in the booths of the following companies: American Instrument Co., Brabender Corp., Illinois Testing Laboratories, Wheelco Instruments Co. Illinois Testing showed an improved "Alnor" Type 4000 Pyrocon for determining surface temperatures of rubber and other products, while Brabender displayed its recently introduced plastograph which measures and records, in graph form, the plasticity of any material from light viscous substances to unvulcanized rubber.

Ball and pebble mills, jar mills, colloid mills, machinery for the reclaiming of rubber, midget pumps, mixing equipment, and other machinery and equipment finding application in rubber manufacturing processes were displayed at the exposition. Equipment of this type was found in exhibitions sponsored by the following: Abbe Engineering Co., American Tool & Machine Co., Baker Perkins, Inc., Barnstead Still & Sterilizer Co., Buffalo Foundry & Machine Co., Chemicolloid Labs., Inc., Eastern Engineering Co., Mixing Equipment Co., Premier Mill Corp., Robinson Mfg. Co., Sprout, Waldron & Co. Batch scales were displayed by the Exact Weight Scale, Fairbanks-Morse, Kron and Toledo Scale companies.

Many New Chemicals Shown

Included among chemicals and compounding ingredients of special interest to the rubber industry shown at the exposition were the Nypene Resins, which find application as softener and plasticizer agents, displayed by the Neville Co.; synthetic resin emulsions, which act as extenders for latex, displayed by the American Resinous Products Corp.; lactose, or milk sugar, which acts as a preservative for latex and a stabilizer for latex emulsions, exhibited by Seal-Test, Inc.; softeners and plasticizers, displayed by Hercules Products Co. Parlon chlorinated rubber was also exhibited by the latter concern. A number of recently developed wax and other substitutes, many of which are finding use in the rubber industry, was shown by the Glyco Products Corp.

Coming Events

Dec. 18. Buffalo Rubber Group, Xmas Party, Hotel Westbrook, Buffalo, N. Y.

Dec. 19. Chicago Rubber Group, Xmas Party, Chicago, Ill.

Feb. 3. Los Angeles Rubber Group, Mayfair Hotel, Los Angeles, Cal.

Feb. 5. Chicago Rubber Group, Congress Hotel, Chicago, Ill.

Apr. 20-24. 103rd Meeting, A.C.S., Memphis, Tenn.

Sept. 7-11. 104th Meeting, A.C.S., Buffalo, N. Y. Rubber Division Headquarters: Hotel Lafayette.

O'NEIL, OF GENERAL TIRE, URGES EXPANSION OF GUAYULE

William O'Neil, president of the General Tire & Rubber Co., Akron, early this month urged legislative support of the bill now pending in Congress which calls for the widespread cultivation of guayule in the United States. In a telegram to Ohio congressmen he maintained that the development of guayule in America's southwest would be the "cheapest, surest way to guarantee a rubber supply in an emergency."

Mr. O'Neil gave four specific reasons in favor of the development of guayule over the expansion in synthetic rubber production facilities, as follows:

1. Huge expenditures necessary for the construction of synthetic plants are unnecessary for use of guayule.

2. Guayule can be used in present rubber-working machinery without making new demands on the defense machine-tool industry.

3. Guayule can be used in the manufacture of tires just as it comes from the rubber-extracting machines. Synthetic must be mixed with natural rubber in tire making.

4. Guayule would give American farmers another crop and could make this country independent of the Far East for rubber.

According to the General Tire executive, a definite plan should be set up for pilot stations to educate and train farmers and mechanics. Seed in great quantities should be produced and stored at these pilot stations so that in case our rubber supply is cut off or prices rise beyond reason we can within a year produce our own rubber. With this system in operation, he said, we would not have to store more than one year's supply of crude rubber.

The plan calls further for the raising of seedlings in California nurseries for transplanting in selected areas in California, Arizona, New Mexico and Texas. The seedlings would be planted 8,000 to the acre and developed in five year cycles in the pilot areas. One phase of the plan provides for the immediate construction of rubber extracting plants in the selected areas, available to farmers and operated by men trained in guayule development.

In arguing that real rubber has many advantages over any synthetic yet produced, Mr. O'Neil referred to reports concerning the use of synthetic rubber by Germany. He said that when German mechanized units first attempted to roll on rubber, the rubber equipment consisted of 65% "ersatz," but because rubber products containing a high synthetic content becomes brittle, Germany had to reduce the proportion to only 35% synthetic.

The 1941 RUBBER RED BOOK is now available. 514 Pages. 6 x 9 Inches. Cloth Bound. $5.00 per Copy.

ASME RUBBER SUBDIVISION HOLDS INTERESTING MEETING

One of the most interesting meetings yet held by the Subdivision on Rubber and Plastics of the Process Industries Division of the American Society of Mechanical Engineers was held on Thursday, December 4th, in the Hotel Astor, New York City. Two sessions were held, morning and afternoon, with three technical papers presented and progress reports on rubber and plastics, respectively, given. More than 100 members and guests were in attendance, the largest turnout experienced to date in the subdivision's five years of existence.

The first paper presented was that on "Vibration and Rubber Springs" by Walter C. Keys of the Mechanical Goods Division, U. S. Rubber Co., New York City. Mr. Keys divided his paper into five parts: (1) Introduction; (2) Examples with Quantitative Results; (3) Technique; (4) Laboratory Data on Calculated vs. Actual Resonance Frequencies; (5) Conclusions. The paper, in general, dealt with rectilinear vibration and the speaker used numerous charts and diagrams. While discussing technique, Mr. Keys listed a number of details required by the engineer in attacking problems involving isolation of vibration by means of resilient supports. Considerable discussion was held on this paper.

At the afternoon session, two papers on plastics were presented, one on "Uses of Plastics in Aircraft Construction," by H. N. Haut of the Bellanca Aircraft Corp., and the other, "Influences of Molecular Structure on the Properties of Plastics," by G. E. Landt of the Continental Diamond Fiber Co. Both papers were well received and were also the subject of considerable discussion. Col. G. F. Jenks, Ordnance Dept., U. S. Army, acted as chairman during the morning session, and L. W. Wallace, vice-president, Trundle Engineering Co., acted as chairman during the afternoon session.

Yerzley Makes Rubber Report

The progress reports were given at the close of the morning session. The report on rubber was made by Felix L. Yerzley, formerly associated with the Rubber Chemicals Dept. of DuPont and now connected with the Engineering Dept., Pioneer Instrument Div., Bendix Aviation Corp. Dr. Gordon M. Kline, of the National Bureau of Standards, delivered the annual report on plastics.

In his report, Mr. Yerzley first stressed the point that a good deal of the mechanical developments which have occurred in the past twelve months in the rubber field have been tied in with defense activities and accordingly little has or can be said of them at this stage, but he intimated that the work accomplished will some day become part of the industry's technical literature. As an indication, he listed a number of rubber products now being used by the armed forces, many of which have come into being within the past year.

Of primary importance in the aircraft engine mounting field, Mr. Yerzley said, has been the standardization and adoption of Dynafocal Suspension for mounting of large radial engines. Dynafocal Suspension is the trade name applied to a directional spring mounting system, so arranged as to obtain a virtual center of gravity suspension, even though the mountings are necessarily attached to the rear of the engine.

Use of Semi-Conducting Rubber

Reference was also made in the report to the increasing use of semi-conducting rubber, which is made by the inclusion of specific types of carbon black in the compound. Semi-conducting rubber is finding special use in quantity wherever static electricity must be eliminated. In concluding the report, Mr. Yerzley referred to the synthetic rubber picture and predicted that the future will see still wider use made of these materials. The full report will appear in an early issue of RUBBER AGE.

In the progress report on plastics, Dr. Kline first stated that there were no outstanding developments in new plastics during 1941 inasmuch as all efforts were concentrated on increasing the output of established products.

Continuous extrusion, he said, has made phenomenal strides during the year and is providing plastics in decorative and structural shapes to replace aluminum, stainless steel, and other metals. The process differs from the former technique employed in that the composition hardens simply by cooling whereas previously solvents had to be added to obtain proper flow and the solvent had to be removed in a seasoning process.

Discussing fabrication of aircraft structures, the speaker stated that the rubber bag molding process is now recognized as a practical method for producing airplanes using materials and labor which are more readily available than those required for metal planes. Dr. Kline listed several new applications of plastics which have appeared in the past year and then made mention of some new advances in testing and properties.

New Officers of Subdivision

During the course of the meeting new officers of the subdivision were announced, as follows: *Chairman,* J. F. Downie Smith (United Shoe Machinery Co.); *Vice-Chairman,* Gordon M. Kline (National Bureau of Standards); *Secretary,* E. F. Riesing (Firestone Tire & Rubber Co.). In addition to these three officers, the new executive committee of the subdivision includes the following: R. A. North (Farrel-Birmingham), F. L. Yerzley (Pioneer Instrument), L. E. Jermy (*Machine Design*), and Col. G. F. Jenks.

In the above reproduction J. P. Seiberling, president of the Seiberling Rubber Company of Akron, is seen presenting the first 20-year service pin to his father, F. A. Seiberling, founder, first president and now chairman of the board of directors, while his uncle, C. W. Seiberling, vice-president of the company, applauds. The occasion was a banquet celebrating the twentieth anniversary of the company, held in Akron on November 15. *(See story on page 216)*

CANADIAN RUBBER GROUPS HOLD INTERESTING SESSIONS

Both of the Canadian rubber groups have held two meetings each since our last issue. All of these meetings attracted good attendance and were marked by the delivery of interesting papers.

The Ontario Rubber Section of the Canadian Chemical Association held meetings on November 14 and December 11. The November meeting, held at the Walper House in Kitchener, was attended by approximately 70 members and guests. W. B. Wiegand, of the Columbian Carbon Co., spoke on "Further Electron Microscope Studies on Colloidal Carbon and the Role of Surface in Rubber Reenforcement." As indicated by the title, he discussed the result of additional studies made with the electron microscope since the publication of earlier work.

Dr. William F. Tuley, Sales Manager, Rubber Chemicals and Reclaim, Naugatuck Chemical, Division of U. S. Rubber Co., was the principal speaker at the December meeting of this group, held at the University of Toronto in Toronto. Taking as his subject "War Time Chemical Supplies for the Rubber Industries," Dr. Tuley discussed the present supply situation in rubber chemicals and also outlined procedures in priorities and allocations followed by government authorities.

The two meetings of the Quebec Rubber & Plastics Group were held on November 19 and December 5. The first meeting, which was held jointly with the Montreal Section of the Society of Chemical Industry, was held in the Ritz-Carlton Hotel in Montreal. T. S. Carswell, director of research of the Monsanto Chemical Co., spoke on "High Strength Molding Compounds." New data was presented to show that high strength molding compositions with phenol-aldehyde resins have a wider temperature range of usefulness than thermoplastic materials.

"Synthetic Rubbers in War-Time" were discussed by J. W. Crosby, of the Thiokol Corporation, at the December meeting, held at the Faculty Club in Montreal. Mr. Crosby dealt not only with the effect of the war on synthetic rubber production but on its probable effect on the future of synthetics as well. Members of the Junior Section of the Engineering Institute of Canada were invited to attend this meeting.

New Foundation Organized

Word has been received that the Netherlands Indies Rubber Research Institute was organized on June 26, 1941, with headquarters at Buitenzorg, Java, N.I. The new Institute was established conjointly by the Government of the Netherlands Indies, the Association of Rubber Planters of Sumatra's East Coast, and the Federation of Owners of Rubber Estates in the Netherlands East Indies.

The Department of Rubber Research of the Experimental Station at Buitenzorg has been incorporated in the Institute, which will be financed by an export tax on rubber as provided for in the by-laws of the International Rubber Regulation Committee.

Dr. P. Honig, formerly director of the experimental station for the sugar industry of Java, has been named director of the Institute. Dr. G. M. Kraay, who has been head of the Department of Research of the West Java Experimental Station, has been put in charge of the new research laboratories.

FINANCIAL

Norwalk Tire & Rubber Co.

Year Ended September 30: Net profit of $89,071 after provision of $36,000 for Federal income taxes, equal to 29c each on 202,230 shares of no-par common stock, after annual dividend requirements on 8,784 shares of 7% cumulative $50-par preferred stock on which unpaid dividends amounted to $3.50 a share on September 30. In the preceding fiscal year the company reported a net loss of $52,714.

Columbian Carbon Company

First Nine Months: Net profit of $2,540,968, equal to $4.73 per share, which compares with $2,418,198, or $4.50 a share, in the corresponding 1940 period. Provision for Federal taxes for the period amounted to $1,430,000, as compared with $600,000 during the 1940 period.

Raybestos-Manhattan, Inc.

Nine Months Ended September 30: Net profit of $1,745,894 after provision of $3,328,652 for estimated Federal income taxes, equal to $2.78 each on 628,100 shares of no-par capital stock, which compares with $1,359,622, or $2.16 a share, earned in the 1940 period.

United Carbon Company

First Nine Months: Net profit of $1,214,551 after provision of $885,000 for Federal income and excess profits taxes, equal to $3.05 a common share. This compares with $1,078,707, or $2.71 a share, reported for the corresponding period of the previous year.

Mansfield Tire & Rubber Co.

Nine Months Ended September 30: Net profit of $197,663. With a loss carry-over from 1940 in excess of this amount, the company reports that Federal income taxes are not applicable to such earnings.

LOCAL RUBBER GROUPS SET DATES FOR FINAL MEETINGS

Local rubber groups throughout the country have just held or will shortly hold their final meetings of the 1941 season. Ambitious programs have been planned in practically all cases. Reports on all of the meetings, brief references to which follow, will be made in our next issue:

The New York, Boston and Detroit groups were all scheduled to have held meetings on Friday, December 12. The New York meeting was to have been the annual Christmas party, with election of officers, entertainment, and distribution of prizes scheduled. Boston was to see the two Farrel-Birmingham movies, "Robots and Rubber" and "Rubber at the Rouge," with election of officers also scheduled. C. F. Kettering, vice-president and director of research, General Motors Corp., was to have addressed the Detroit meeting.

The Buffalo Group has scheduled its second annual Christmas party for Thursday, December 18, at The Westbrook, in Buffalo, N. Y. A nominating committee has selected candidates for officers for the coming year and elections will be held immediately after dinner. J. M. Cranz has arranged a program of entertainment, the details of which are being held as a surprise for those attending the meeting.

Chicago's annual Christmas frolic and Ladies' night will be held in the Gold Room of the Congress Hotel on Friday, December 19. As usual, the evening will be devoted to wholesome fun, with gifts for all the ladies. An all-star show, headed by Eddy Peabody, gifted banjoist, will be the feature attraction. Tickets are $3.00 each.

New Abstract Service Available

Interscience Publishers, Inc., 215 Fourth Ave., New York City, announced that the first issue of its abstract service will be published at the end of January, 1942, after one year of careful planning. The service will cover the chemistry, physics and technology of resins, rubbers and plastics and will form a current supplement to the high polymers series now being published by the company. The abstracts, which will include tables, curves, graphs and flow sheets, will be edited by Prof. H. Mark and Dr. E. S. Proskauer. Subscription price is $35.00 per year. Further details may be secured from the company.

Form Red Bank Rubber Co.

Maurice Sanders, formerly factory manager of the Ideal Rubber Co., and Fred Siemer, previously associated with the sales staff of that company and before that with the Sponge Rubber Products Co., have organized the Red Bank Rubber Co. in Red Bank, N. J. The new factory, which will be in operation shortly, will manufacture mechanical molded and sponge rubber goods.

FURNEX

Beads or Dense

for EXCEPTIONAL RESILIENCE

THE SEMI-REINFORCING RUBBER CARBON

A COLUMBIAN COLLOID

BINNEY & SMITH CO. · COLUMBIAN CARBON CO.

DISTRIBUTOR MANUFACTURER

The Pioneer Semi-Reinforcing Carbon Reaches Its Majority

Twenty-one years ago Matlock began producing for the first time a free soot colloidal carbon made from natural gas. Two years later, experts from the Columbian Carbon Company joined him. Shortly thereafter the product which came to be known as Fumonex met with steadily increasing favor in the rubber industry wherever non-impingement carbons were in demand.

During the intervening years quality was improved, grit and staining tendencies eliminated, and rubber compounding properties standardized.

Now a wholly new system of collection has been installed and plans prepared for increased production. As Fumonex, this product has now, on its twenty-first anniversary, met with such a response as to render existing facilities for its production totally inadequate.

Larger Plant and a New Name

Increased production along still more highly refined lines, permitting greater flexibility and minute control of each important property; the location of new research and control laboratories at the site of the new plant, accompanied by increased technical personnel, seem to justify, and in fact demand, a new and more accurately descriptive name for our expanded and perfected production of colloidal carbons of the furnace category.

The furnaces of Matlock pioneered the semi-reinforcing field; the new furnaces of Columbian Carbon, now nearing completion, represent the ultimate in modern design and scientific research.

Therefore, with twenty-one years of experience in the production of furnace carbons, including the earliest and latest designs, we have announced

FURNEX

A Columbian Colloid

THE SEMI-REINFORCING CARBON FOR RUBBER

BINNEY & SMITH CO.
DISTRIBUTOR

COLUMBIAN CARBON CO.
MANUFACTURER

F. B. DAVIS SEES SOLUTION TO PROBLEMS OF PROCESSING

Early solution of one of the biggest problems in connection with synthetic rubber was foreseen by F. B. Davis, Jr., president of the U. S. Rubber Co., in a talk given before the Yale Club of Montclair, at the annual party of the club, held in Montclair, N. J., on December 6.

"One of our biggest problems with the synthetic product has been the processing of it," Mr. Davis said. "Great strides toward the solution of this problem have been made recently. It is now possible to foresee using synthetic as easily as natural rubber." Mr. Davis, as guest of honor, was awarded the Montclair Yale Bowl, a silver trophy presented by the club each year to the alumnus who has made his "Y" in life.

According to Mr. Davis, 30% of the rubber industry's production is currently for defense. Relative to the effect of this production on the consumer, the U. S. Rubber executive cited the fact that since the first of the year the tire industry has cut in half the number of types of passenger car tires and has eliminated all white sidewall tires, the footwear manufacturers have reduced the number of shoe items by one-third and have discontinued many styles and colors, the number of styles of hot water bottles have been cut by one-third, the number of styles of all-rubber swim suits have been cut by one-half, and similar changes have been made.

Mr. Davis, in closing his remarks, stressed the point that there is no shortage in the production of crude rubber, the shortage being only in the amounts made available to the rubber manufacturers by the government, such shortage being due to the government's desire to build a large reserve supply in as short a time as possible.

Organize Jacobs Rubber Products

Jacobs Rubber Products, Inc., has been organized at Danielson, Conn., as a manufacturing subsidiary of the E. H. Jacobs Mfg. Co. The new company is occupying a specially constructed plant and operations are already under way. The company will manufacture rubberized canvas products for the textile and other industries. J. E. Moe has been appointed vice-president and production manager of the new concern.

Set Division Meeting Dates

The next Fall meeting of the American Chemical Society has been set for September 7 to 11 in Buffalo, N. Y., other reports to the contrary. By custom, the Division of Rubber Chemistry will meet on September 10 and 11. Headquarters for the division will be at the Hotel Lafayette. Burt W. Wetherbee, of the Globe Woven Belting Co., is handling affairs for the meeting for the division.

O.P.A. Announcements

The following announcements, of direct interest to the rubber industry, were made by Leon Henderson, Administrator of the Office of Price Administration, since our last issue:

On December 3 twenty-seven manufacturers of rubber footwear were asked to refrain from advancing prices on their products. According to Mr. Henderson the O.P.A. has information indicating that price increases have taken place in almost all types of rubber footwear and such increases are contributing to inflation. At the same time, the manufacturers were requested to give notice to the O.P.A. of any contemplated changes in the quality of their products.

On the same date, December 3, the O.P.A. announced that increases in the prices of camelback were being investigated. Pending completion of the study, all manufacturers of camelback, used in the retreading of tires, were required not to advance prices further.

On November 25, Mr. Henderson stated that individual agreements stabilizing prices of organic and inorganic dry colors at the levels of October 1 have been reached with all of the large producers.

PERSONALS

A. B. TATISCHEFF, chief statistician of the Commodity Exchange, Inc., has received a leave of absence from that office to become Principal Economist in the Bureau of Research and Statistics of the Office of Production Management in Washington, D. C.

DANIEL A. KIMBALL, for more than 21 years associated with the General Tire & Rubber Co., as district manager for the Pacific Coast, has been placed in charge of the new office of the company set up in Washington, D. C., to coordinate defense activities. V. H. ORR of the engineering department of the home office in Akron has also been assigned to the new office.

JAMES H. WATTERS, of Marion, Ohio, has been elected president of the Union Asbestos & Rubber Co., Chicago, succeeding L. L. COHEN, advanced to chairmanship of the board of directors. L. J. SILVERMAN is now executive vice-president and treasurer of the company.

SCOTT RUSSELL, executive vice-president of the Bibb Manufacturing Co., Macon, Ga., since 1938, has been elected president of that company, succeeding WILLIAM D. ANDERSON who has been made chairman of the board. A. A. DRAKE was named vice-president and secretary of the company.

TWO NEW PLANTS TO PRODUCE SYNTHETIC RUBBER CHEMICALS

Taking further steps to increase the production of synthetic rubber by making certain there is a sufficient quantity of raw materials needed in such production, the Defense Plants Corporation, a subsidiary of the Reconstruction Finance Corporation, entered into agreements on November 12 calling for the construction of two new chemical plants, involving a total of $5,700,000. Both agreements were made at the request of the Rubber Reserve Co., another R.F.C. subsidiary.

One contract, calling for the expenditure of $3,500,000, was given to the Carbide and Carbon Chemical Corporation. It calls for the construction of a factory in Charleston, West Virginia, to be devoted to the production of butadiene, used in the manufacture of the Buna N type of synthetic rubber.

The second contract was made with the Monsanto Chemical Company. This plant, which will cost $2,200,000, will be located in the vicinity of Galveston County, Texas, and will be built under a lease arrangement. On completion, title will be retained by the Defense Plant Corp. Although no announcement has been made as to the type of chemicals to be manufactured, it is believed that styrene will be the principal chemical produced. Styrene is used in the production of the Buna S type of synthetic rubber.

Preference Order on Titanium

General Preference Order M-44, which directs the distribution of titanium dioxide for use as pigment, through a monthly allocations system, was announced by the Director of Priorities of the Office of Production Management on November 22. Purpose of the order, which becomes effective January 1, 1942, is to set up a defense pool to take care of all mandatory orders and to prorate the remainder on an equitable basis to all customers. The defense pool for the first month is set at 20% of each producer's daily production. The order was originally proposed to go into effect on December 1, but the date was changed to January 1 in order to provide more time for the preparation of needed forms.

Permit Now Needed for Latex

Beginning January 1, 1942, permits will be required for the purchase of normal or concentrated latex, deproteinized rubber and sprayed rubber. Rules and regulations concerning the securing of permits and method of distribution are covered in Circular No. 2, issued by the Rubber Reserve Company on November 24, and subsequent amendments. Distribution will continue to be handled through the usual trade channels. As yet, no price regulation has been applied to these materials.

LOS ANGELES NEWS

The D and M Machine Works at Torrance were slightly damaged by an earthquake which shook that town late in November and the offices have been moved temporarily to the Chamber of Commerce Building. The Rubbercraft Corporation of California plant in the same city was not damaged.

The Bettis Rubber Company, Inc., which began business four months ago manufacturing oil well supplies, is already operating three shifts per day and is contemplating enlarging the plant, according to Charles A. Miller, Jr., superintendent of production. The president of the company, E. B. Barnes, has just returned from a vacation in the mountain areas.

The regular Santa Claus parties for children of employees were scheduled again this year at all "Big Four" plants. At the Goodyear plant the good saint was scheduled to arrive as usual in the big blimp, a realistic procedure.

Ed Royal, local manager for H. M. Royal, Inc., left November 26 for New York and Trenton, N. J. He was due to get back to Los Angeles about December 15. Mrs. Royal accompanied her husband.

C. W. Smith, head of the labor department at Goodyear for some years, has been transferred to the new Goodyear plant at Litchfield Park, Arizona. R. D. Kelley, formerly in the efficiency department, has been transferred to Mr. Smith's former position. The new plant began operations on November 1 and is devoted to the manufacture of airplane parts.

Curtis R. Wolter, who has been assistant purchasing agent for the U. S. Rubber Company, has resigned to take a position with The Kirkhill Rubber Company.

Mrs. C. L. Remy, wife of the factory manager in the U. S. Rubber Company plant here, died at St. Luke Hospital, Altadena, Sunday, November 30, after an illness of some duration. Funeral services were held at Forest Lawn Memorial Park, Glendale, on Wednesday, December 3. Mrs. Remy is survived by her husband and one daughter, Dorothy, age 9.

P. W. Litchfield, chairman of the board of directors for Goodyear, was in Los Angeles on a business trip late in November. J. W. McGrath, of Australia, also spent a few days in Los Angeles en route to Akron late in November. Mr. McGrath, development manager of the Australia plant, is on furlough.

All small rubber plants in Los Angeles seem to be keeping busy. There is a move on by which a number of them may be able to pool facilities in such a way as to handle large defense orders which now can be handled only by larger manufacturers.

E. G. Brooks of the California Golf Products Company, reports that while it is getting difficult to get certain kinds of thread he needs in his business he still is able to keep up production and satisfy his customers. The use of latex thread in golf ball manufacture may offer the solution, he states, if it comes to that.

Expansion of its Los Angeles plant to triple the plant's output of bullet-puncture-sealing fuel tanks for airplanes has been announced by the United States Rubber Company. Construction work will begin at once on an addition that will provide 226,200 sq. ft. of floor space to be used exclusively for assembling the self-sealing tanks. This area, which will comprise one-third of the plant's total, will make possible 300 per cent increase in production of tanks. The remainder of the plant will continue to make tires, many for defense.

The new addition is expected to be completed in six months, with production in it getting under way 30 days thereafter. Several hundred additional persons will be employed. Although specific production figures were not released, it is known that the rubber company is manufacturing self-sealing tanks by the thousands in four of its plants, and of the four the Los Angeles plant is the major producer. Due to the use of a special rubber compound, the self-sealing tank can be pierced by machine gun bullets without loss of fuel.

Rubber Quota Unchanged

Export quotas under the restriction scheme for the first quarter of 1942 will be maintained at 120% of basic quotas, according to an announcement from the International Rubber Regulation Committee, which met in London on December 2. It was also announced that no new planting will be permitted in 1942 or 1943, except a small amount already conceded for experimental purposes. The action of the Committee in maintaining the quota rate at 120% was expected in the trade. Although the action permits unprecedented high shipments, signatory countries are having difficulty in matching permissible shipments.

LOS ANGELES GROUP ELECTS NORTON, OF KIRKHILL, HEAD

Gaelen K. Norton, of the Kirkhill Rubber Co., was elected president of the Los Angeles Group, Rubber Division, A.C.S., at a meeting held on Tuesday, December 2, at the Hotel Mayfair in Los Angeles. He succeeds Leon L. Horchitz of Goodrich.

Other officers named were as follows: *Vice-President,* Charles J. Roese (Goodyear); *Secretary,* Curtis R. Wolter (Kirkhill Rubber); *Treasurer,* L. F. McDonald (Goodrich). The new executive committee is composed of Ed L. Royal (H. M. Royal, Inc.), Carl E. Stentz (Latex Seamless Products), and Phil W. Drew (Goodyear).

The meeting was the best attended in the history of the group, with approximately 165 members and guests present, and possibly the largest number of door prizes and special prizes was distributed.

A pair of football tickets, donated by the Dill Manufacturing Company, went to Dick Behrman (U. S. Rubber); a Parker Life Time fountain pen, by the Johnson Steel and Wire Company, went to Fred Woerner (C. P. Hall); two $25 defense bonds, by the Group, went to Gilbert C. Dohm and Bob Abbott, respectively; two dozen golf balls, by H. Muehlstein and Company, went to Gaelen Norton (Kirkhill). Mr. Behrman surrendered his football tickets because he had purchased others and the pair then went to Ernest Brazil of Blue Star Mines, Ltd.

Special prizes included the following: two football tickets, by the Dill Manufacturing Company, won by Harry Friedman (Commercial Rubber Co.); an electric shaver, by Ed Royal, won by Bill Sturdevant (L. A. Standard Rubber Co.); a fine leather traveling bag, by Ray Morath of Naugatuck Chemical, won by Ray Barbera (Goodrich); a $15 merchandise order, by B. E. Dougherty, won by R. Deitrick (Commercial Rubber); a de luxe Toastmaster set, by the Robert Badenhop Corporation, won by Walter Winnett (National Standard); a General Electric roaster, by Herb Hecht of D. Hecht and Company, San Francisco, won by Lou Konig (Meldowny and Martin, Inc.)

It was announced that a golf tournament would be held at the Altadena golf course on Saturday, December 13, under the direction of E. G. Brooks, chairman of the golf committee. It was also announced that a directory of membership would be published this winter with names listed as of January 1.

Table favors were unique. They were boxes of California dates arranged for by L. F. McDonald and donated by R. C. Nicoll of the Valeria Jean Date Shop, Thermal, California. Cigars were distributed at the expense of Ed Royal of H. M. Royal, Inc.

There will be no January meeting due to the nearness of the first Tuesday in January to New Year's Day. The next meeting will be on Tuesday evening, February 3.

Monsanto Denies New Synthetic

The Monsanto Chemical Co., St. Louis, Mo., has issued a formal denial that the company has developed a synthetic rubber. According to press reports, the company had developed a synthetic "so revolutionary it will replace all rubber used in various essential defense products." The report, purportedly quoting an announcement from Monsanto's central research laboratory in Dayton, was believed to be confused with the accurate report that the company had secured financing for the construction of a plant in Galveston County, Texas, for the production of chemicals used in synthetic rubber manufacture, as reported elsewhere in this issue.

Tire Factory for Portugal

It is understood that the General Tire & Rubber Co., in conjunction with a group of Portuguese financiers, is planning the construction of a tire factory in Portugal. According to the report, ground has already been purchased and a contract let for construction of the plant which, barring unforeseen contingencies, will be completed and in operation by mid-1942. General Tire's interest is said to be approximately $125,000. The new plant, which will be under the supervision of General Tire engineers, will produce about 300 tires and tubes a day.

Synthetic Rubber Suit Filed

Jasco, Inc., filed suit against the Hycar Chemical Co. and the B. F. Goodrich Co. on October 4 in the District Court of the Northern District of Ohio. The suit alleges infringement of patents relating to the emulsion and polymerization of butadiene and the production of so-called Buna S synthetic rubber. Jasco, Inc., is a holding company organized by the Standard Oil Co. and the I. G. Farbenindustrie, A.G., and has American rights to the Buna patents of the latter company.

Allied Absorbs Barrett Co.

The Barrett Co., wholly-owned subsidiary of the Allied Chemical & Dye Corp., has been merged with the parent company and hereafter its business will be conducted in the name of the Barrett Division, Allied Chemical & Dye Corp. No change was made in products or personnel.

Appoints Agent on Guayule

The Cia Hulera de Parras, S.A., of Parras, Coahuila, Mexico, announces that arrangements have been completed for the exclusive sales of its entire output of guayule by the Rubber & Rubber Chemicals Department of the American Cyanamid and Chemical Corp., 30 Rockefeller Plaza, New York City.

Schwartz Joins Moore & Munger

Emil W. Schwartz, chief chemist of the wire department of the General Electric Company at Bridgeport, Conn., since 1927, and associated with that company since 1924, recently resigned from the

company and is now associated with the technical service sales organization of Moore & Munger, New York City. His new duties will deal with technical service and sales promotion work on Catalpo, Paraforce and Synthetic 100.

Mr. Schwartz was born in Bridgeport, Conn., on July 25, 1897. He is a graduate of the Sheffield Scientific School of Yale University and joined General Electric as a chemist in the wire department shortly after being graduated. His initial duties required a study of wire and wire design and subsequently he took up the problems in chemistry and technique involved in the industrial use of rubber.

In 1934 Mr. Schwartz received the Charles A. Coffin Award of Achievement, given by General Electric to employees achieving special prominence through their research activities. In Mr. Schwartz's case the award was given in recognition of his "outstanding skill in compounding new and improved rubber materials."

Widely-known throughout the rubber industry, Mr. Schwartz is an active member of the Rubber Division, A.C.S., the New York Rubber Group, and Committee D-11 on Rubber Products of the A.S.T.M.

Development of a new technique in wrapping of oranges and other citrus fruits employing the use of Pliofilm, thus making possible the extension of preservation of these products for months at regular refrigeration temperatures, has been announced by Goodyear. Pliofilm-wrapped grapefruit stored at 70° F. for seven months retained its texture and juices, and seeds showed no indication of sprouting.

The ban recently placed on the wrapping of a variety of non-defense items with cellophane and other transparent materials includes the wrapping of rubber and rubber products with such materials. Reason for the ban is found in the many basic chemicals which are used in the manufacture of these wrapping materials.

Offer Cotton Testing Service

Scientific measurements of the length, fineness and strength of cotton fibers have been offered to all interested parties by the Fiber Research Laboratory of the University of Tennessee, Knoxville, Tenn. A small fee will be charged to defray operating costs. Employing new fiber-testing instruments, two of them developed by a University of Tennessee professor, the service will furnish speedy measurements expressed in figures which are easily understood. The offer was made at the request of various cotton interests, who are seeking a more exact method of determining cotton properties.

Opens New England Warehouse

L. Albert & Son, dealers in new and used rubber and plastic machinery, have opened a warehouse in Stoughton, Mass. A complete line of rubber machinery will be carried in the new warehouse which, when fully outfitted, will include a modern machine shop for rebuilding used machinery as well as for building new machinery. A welding shop for rebuilding and renovating Banbury mixers is also planned. The Albert firm now has offices and warehouses in Trenton, Akron and Los Angeles.

Parlon Production Expanded

Plans for the expansion of production facilities for Parlon, the chlorinated rubber manufactured by the Hercules Powder Co., Wilmington, Delaware, have been announced. The enlargement of plant facilities at Parlin, N. J., expected to be completed by next February, will increase present production by approximately 50%. A general preference order placing the stocks and sales of chlorinated rubber under mandatory control was issued last month.

Textile Defense Exhibit

A Textile Defense Exhibit, which will be maintained for the duration of the emergency, has been set up in the Smithsonian Institute in Washington, D. C. In addition to such displays as nylon for parachutes and rayon for parachutists' uniforms, several rubber products are exhibited, including sponge rubber fillings for airplane wings and rubber cushioning materials for tanks. The use of plastics is also portrayed.

Lecture Series on Plastics

New York University is offering a series of six lectures on plastics. The lectures, which are given from 8:00 to 9:45 P.M., cost $1.50 each or $9.00 for the complete set. Two lectures have already been given and the remaining four comprise the following: Extruded Plastics (Dec. 23); Laminated Plastics (Jan. 6); Plastic Coatings and Finishes (Jan. 13); Rubber and Synthetic Rubber (Jan. 30).

CANADIAN NEWS

The office of Canadian rubber controller A. H. Williamson, working in cooperation with rubber manufacturers, is making a study of the possibility of reducing inventories of finished goods by simplifying the number of styles and colors of various articles currently manufactured.

The rubber footwear business is particularly susceptible to this type of simplification since it has always been plagued by the necessity of producing an extremely varied line of merchandise in order to keep abreast of competition. Shoe retailers in turn have been forced to carry extra large inventories because of the many styles and colors of goods available.

As a first step in the simplification program, the controller's office and manufacturers have agreed to eliminate 43 per cent of the present lines from rubber footwear. Further studies are being made of other rubber goods including automobile tires.

Consumption of rubber in Canada for the production of non-defense goods in December will be at the rate of 80 per cent of the monthly average used in the year ended May 31, 1941. Additional five per cent reductions in the next two months will bring the percentage down to 70 per cent in February, 1942. By resorting to these measures it is hoped to build up a reserve of 50,000 tons, or approximately one year's supply, in the Dominion by the end of next March.

The controller's office has recently announced the appointment of John Alexander Martin as administrator of rubber and rubber products. Mr. Martin is a vice-president of the Dominion Rubber Company, Ltd.

Herbert H. Horsfall, president and managing director of the Canada Wire and Cable Co., Ltd., has been elected a director of the Imperial Bank of Canada to fill the vacancy caused by the death of Frank A. Rolph. Mr. Horsfall is also a director of the Toronto General Trusts Corporation, the Consumers Gas Company, General Steel Wares, Ltd., the Leaside Engineering Company, and a number of other companies.

T. Harry Ainlay, purchasing agent of the B. F. Goodrich Co. of Canada, Ltd., Kitchener, was recently elected to the municipal council in that city. This was Mr. Ainlay's first venture into the political field and he is now professing great surprise at the successful result.

Fred N. Stubbs, president of the Western Rubber Co. of Canada, Ltd., Alton, Ontario, died on October 20. Mr. Stubbs, a native of Alton, first entered the rubber business when he organized a company in Regina. In 1927 he returned to the Caledon district to establish the Western company at Alton. Mr. Stubbs was a member of the Canadian Manufacturer's Association.

M. L. Brown, vice-president and factory manager of the Seiberling Rubber Co. of Canada, Ltd., was one of 32 veteran Seiberling employees who were honored at the company's twentieth anniversary party held in Akron on November 15. The group, all of whom have worked for the Seiberling company since it was organized in 1921, were presented with gold service pins and became charter members of the company's Twenty Year Club.

R. C. Berkinshaw, chairman of the Wartime Industries Control Board for Canada and former general manager of Canadian Goodyear, was one of the principal speakers at the national convention of the Canadian Motor Transport Industry held in Toronto on November 28 and 29.

Dunlop Tire and Rubber Goods Company, Ltd., has declared a fifty cents a share dividend on its common stock payable December 20 to shareholders of record December 15. The common dividend will be the third paid by the company, similar amounts having been paid in each of the two preceding years. All of the common shares are held by the Dunlop Rubber Company, Ltd., of Great Britain, and by Canadian Industries, Ltd., a DuPont subsidiary.

Imports of crude rubber into Canada in September, 1941 were the greatest of any month in history. Imports amounted to 38,293,221 pounds compared with 6,061,154 for the same month in 1940. This unprecedented addition to the country's rubber supply brought the total imports of crude for the first three quarters of the year up to 127,255,620 pounds, an increase of 86.9 per cent over the first nine months of last year.

Automobile tires and tubes were included in the list of articles subjected to the provisions of the order recently announced by the Wartime Prices and Trade Board to curb installment credit transactions. The order, which it is hoped will help check the steadily increasing demand for consumer goods, provides that the minimum down payment on any article must be one third of the total cash price and in no case less than $10 at the time of delivery.

MONTH OF NOVEMBER MARKED 10TH ANNIVERSARY OF NEOPRENE

The tenth anniversary of the introduction of neoprene was reached last month. In view of the great strides achieved by this synthetic rubber, developed and marketed by the Rubber Chemicals Division of E. I. du Pont de Nemours & Co., the following brief history may prove of interest:

Neoprene, first known as "DuPrene," was announced in Akron on November 2, 1931. Initial production schedules called for a mere 250 pounds a month, to sell at over a dollar a pound, this at a time when natural rubber was priced at six cents a pound. Yet so versatile is this material and so wide its applications that today approximately 1,500,000 pounds are being produced each month, while the price has been reduced by nearly fifty per cent.

In addition to extensive increases in productive capacity at the initial neoprene plant in Deepwater, N. J., DuPont is building a new factory at Louisville, Ky. When this new plant goes into operation, some time next year, production of neoprene will total approximately 3,500,000 pounds per month. Neoprene, like other commercial synthetic rubbers, is a vital material to the national defense program.

Akron Group Hears Troller

Dr. T. H. Troller, director of the Guggenheim Institute, was the principal speaker at a meeting of the Akron Group, Rubber Division, A.C.S., held at the City Club in Akron, Ohio, on November 7th. Approximately 225 members and guests were in attendance. Dr. Troller delivered an interesting talk on the research problems which develop with the application of airplane design to war-time needs. He discussed the effect, on both airplane and pilot, of high altitude speed flying and also the effects of fighting maneuvers on the design and speed of fighting planes which combat bombers. At the meeting it was announced that W. J. Krantz has taken over the duties of secretary-treasurer of the group. D. G. Benson, the former secretary-treasurer, has moved from Akron.

Seiberling Marks 20th Anniversary

A banquet attended by more than 200 workers and officials in Akron on November 15th marked the 20th anniversary of the incorporation of the Seiberling Rubber Co. J. P. Seiberling, president of the company, presented twenty-year service pins to his father, F. A. Seiberling, founder of the company and now chairman of the board, and to his uncle, C. W. Seiberling, vice-president. Also honored at the banquet was W. Edwin Palmer, who left Goodyear to become secretary of the company at its formation.

OBITUARIES

Francis R. Henderson

Francis Robinson Henderson, one of the organizers and the first president of the Rubber Exchange of New York, now merged into the Commodity Exchange, Inc., died in the Presbyterian Hospital in New York City on November 13 at the age of 57. One of the most widely known men in rubber trade circles, Mr. Henderson was engaged in that trade ever since he was fourteen years old and made and lost two fortunes in rubber.

Born in Port Chester, N. Y., on June 4, 1884, Mr. Henderson received his education in the public schools. His father died when he was fourteen and he went to work as an office boy for an uncle, Francis H. Robinson, a New York rubber importer. After working for his uncle's firm in both New York and Akron for several years, Mr. Henderson was finally made a partner, but in 1909 he organized the firm of Henderson & Korn, with Ernest A. Korn as a partner, and began importing rubber from Brazil. This firm continued in business until Mr. Korn's retirement in 1917, when Mr. Henderson continued the business under the name of F. R. Henderson & Co.

In 1918 Mr. Henderson went to Singapore and bought the International Trading Co. Later, he organized Henderson, Forbes & Co., with offices in New York and London. This business prospered until the crash in rubber in 1921 when Mr. Henderson lost the first fortune he had created. He persisted in the rubber business, however, and shortly thereafter organized the Crude Rubber & Foreign Products Corp. with borrowed capital, the name of this firm later being changed to Henderson, Helm & Co.

Several years later, in 1929, Mr. Henderson was named president of the New York & Republic Corp., an investment trust, and the following year he organized the Basic Commodities Corp. to invest in commodities and raw materials. In January, 1931, shortly after the price of rubber had touched an all-time low, Mr. Henderson lost his second fortune and filed a petition in bankruptcy. Two years later he returned to the rubber business as manager of the rubber department of Clark, Childs & Co. At the time of his death he was dealing in commodities.

During the existence of the firm of Henderson, Helm & Co., rubber imports increased tremendously and Mr. Henderson began an aggressive campaign for the organization of a rubber exchange in New York similar to the one operated in London. He obtained a charter for the organization and in 1926 the Rubber Exchange of New York, Inc., opened in New York City with 250 members. It was the only exchange dealing exclusively in rubber although the Cocoa & Rubber Exchange, a rival, had opened in New York a few days earlier. He served as president of the exchange for four years during which time commissions were lowered 40%, saving hundreds of thousands of dollars annually for rubber manufacturers.

In addition to his activities in rubber, Mr. Henderson was a director of the National Metal, National Raw Silk and New York Hide exchanges. He was a former president of the congregation of the Second Presbyterian Church. From 1921 to 1927 Mr. Henderson resided in Montclair, N. J., but since 1927 he had lived in New York City. He leaves a widow, five daughters and three brothers.

Robert Kelton

Robert Kelton, former London and Paris rubber merchant, who came to the United States from Paris a year ago after the fall of France, died at his home, 71 Washington Square South, New York City, on November 21 at the age of 64. Death was attributed to a heart attack. Mr. Kelton, who was born in Paris, was a veteran of the World War, a member of the Legion of Honor, and a holder of the Interallied Medal of Victory. Since his arrival in the United States he had been associated with the firm of Hirsch, Lilienthal & Co., brokers, of New York City. He leaves a widow, two sons and a daughter.

Harlan D. Hibbard

Harlan D. Hibbard, foreman of the belt rooms of the Goodyear Tire & Rubber Co., and one of the best known figures in the Goodyear organization, died at his home, 437 Malvern Road, Akron, Ohio, on November 23, at the age of 38, following an illness of several months. Born in Ithaca, N. Y., Mr. Hibbard was graduated from the University of Missouri in 1925 and from M.I.T. in 1927. He joined Goodyear in the latter year and served in South America and Spain until 1930. He leaves a widow and two children.

B. H. Pratt

B. H. Pratt, who served as general manager of the Cudahy, Wisconsin, plant of the former Federal Rubber Company from 1919 to 1930, died in a hotel in Milwaukee, during a visit to that city, on November 11. He was 70 year of age.

Samuel H. Clark

Samuel H. Clark, president of Whittaker, Clark & Daniels, Inc., died on November 14 after suffering a heart attack at his home, 7 Roosevelt Road, Maplewood, N. J. He was 62 years old.

Born in Newark, N. J., Mr. Clark received his education in the public schools and after being graduated from high school in 1897 went to work for the W. H. Whittaker Co. In 1916 Mr. Clark became president of the company which, two years later, changed its name to Whittaker, Clark & Daniels, Inc. Mr. Clark, at the time of his death, was also president of the Whittaker Micronizing Corp. and the Reduction Engineering Corp., and a director of the Fine Pigments Corp.

Mr. Clark was an active member of several trade groups, including the Paint, Oil & Varnish, Perfumers, Mineral Products and Toilet Goods associations, and a former member of the executive committees of the National Association of Manufacturers and the Associated Industries of New York State. He was well known in Methodist church affairs.

Joseph T. Redmond

Joseph T. Redmond, purchasing agent at the Buffalo, N. Y., plant of the General Cable Corporation for many years, and widely known in rubber circles in and around the Buffalo area, died at his home in Buffalo on November 10 following an operation several weeks earlier to relieve a heart condition.

Mr. Redmond was born in Rome, N. Y., on March 20, 1897. He served in the Navy for three years during the last war and was honorably discharged as a first class gunner and torpedo man. He lived in Rome until 1921 when he moved to Buffalo at the time the Buffalo plant of the Rome Wire Co., now the General Cable Corp., was started.

A lover of outdoor life and dogs, Mr. Redmond raised championship stock cocker spaniels as a hobby. He is survived by his wife, three sisters and a brother.

We take pleasure in announcing that arrangements have been completed for the exclusive sale of our entire output of

Guayule

by the
RUBBER & RUBBER CHEMICALS DEPARTMENT
AMERICAN CYANAMID AND CHEMICAL CORPORATION
30 Rockefeller Plaza, New York, N. Y.

•

Cia Hulera de Parras, S. A.
Parras, Coahuila, Mexico

NEW EQUIPMENT

Tensile Meter for Tire Cord

A new scientific device for use by tire dealers and service stations to test the tensile strength of cord in used tires has been developed and introduced by the Tensilometer Corp., 1231 East 7th St., Los Angeles, California. Called the Tensile Meter, it is graduated

in pounds and has a dial divided into three zones — green for safety, orange for caution, and red for danger. When the cord being tested is broken, the hand remains in a stationary position and indicates the tensile strength. If the hand remains in the safety zone, it indicates a cord test of over 12 pounds; if in the caution zone, the cord tests between 10 and 12 pounds; if in the danger zone, it is indicative of less than 10 pounds and the tire should be replaced. The cord to be tested can easily be removed from the tire from the inside splice where it overlaps. Either fabric or rayon cords can be tested.

Foxboro Model 30 Stabilog Controller

When the Stabilog Controller was first introduced by the Foxboro Co., Foxboro, Mass., it was featured as the first instrument providing full proportional control with automatic reset of the control point. Many thousands of installations have since been made, in applications involving control of temperature, pressure, liquid level, or flow; and it is an impressive fact that in more than ten years of this field experience, no changes have been found necessary in the fundamental principles of operation. In introducing the new Model 30 Stabilog Controller, now, Foxboro emphasizes the fact that the new features are principally refinements, for better appearance and still closer control, but that the Model 30 does not depart from the tested and proven Stabilog Control principles.

The Model 30 appears in the new universal rectangular case, which combines practical convenience with attractive appearance. When panel-mounted, the instrument extends only ¾ inch from the panel surface. The door is recessed; hinges and hasp are flush

with the door surface. A dual pressure indicator, replacing the customary two small gauges, is easily seen through a rectangular opening in the door. Interior illumination is readily provided when desired.

All operating adjustments are made from the front of the case, the adjusting mechanisms for change of control point, throttling range, and reset resistance being immediately accessible when the door is opened. But the entire operating mechanism is protected and concealed behind a removable plate. Unit construction simplifies replacement of the measuring system, changing the type of control, or any other major servicing of the mechanism that may ever be necessary.

Ashcroft Power Control Valve

The Ashcroft Power Control Valve for high pressure installation from 1800 to 2500 pounds is announced by the Consolidated Safety Valve Division of Manning, Maxwell & Moore, Inc., Bridgeport, Connecticut. This new valve is an automatic relief valve that may be set for a 1% or less difference between opening and closing pressure; which effects a large saving over the 4% required for the spring loaded safety valves. The immediate results are more accurately balanced boiler operation at peak loads and more uniform line pressure. In addition, its use reduces spring-loaded safety valve maintenance expense.

The regular spring-loaded safety valves rarely pop in service when an Ashcroft Power Control Valve is used. It is set to open at a slightly lower pressure than any of the safety valves, making it possible to continue a more even rate of steaming with a more uniform line pressure.

The principle of operation of the valve is very simple. The boiler drum or superheater outlet pressure or steam header pressure actuates a pressure control set at the popping pressure, which operates an electric contact on a difference in pressure of 1% or less. The electric current is transmitted to a solenoid which opens

ADVERTISEMENT

He uses HYCAR, sonny.
It resists heat better.

See page 227

BAIRD

MANUFACTURERS' CRUDE RUBBER PURCHASE PERMITS

▲

• Our long experience since 1903, together with our friendly relations with our old and new customers ideally equips us for the prompt, efficient and thoroughly satisfactory handling of

Manufacturers' Crude Rubber Purchase Permits

• We shall continue to appreciate and respect the business of our old friends and assure the new ones that their orders will be handled with courtesy and efficiency . . . . . .

▲

BAIRD RUBBER & TRADING CO., Inc.
WOOLWORTH BUILDING
233 Broadway New York

BARCLAY 7-1960

WILLIAM T. BAIRD, JR. COLLIER W. BAIRD
HAROLD W. HOLCOMBE DENIS P. MOCHARY

Books . . . .

RUBBER RED BOOK—1941 Edition
Directory of the Rubber Industry
Cloth Bound, $5.00

ANNUAL BIBLIOGRAPHIES OF RUBBER LITERATURE
Compiled by D. E. Cable, Ph.D.
For Years 1935, 1936, 1937, each, Cloth, $2.00
For 1938-1939, Cloth, $4.00

LATEX IN INDUSTRY
By Royce J. Noble, Ph.D.
Text Book on Latex. Price: $7.00

LATEX AND ITS INDUSTRIAL APPLICATIONS (Vol. I)
By Frederick Marchionna
Bibliography of latex patents and literature to June, 1932. Price: $15.00

LATEX AND RUBBER DERIVATIVES AND THEIR INDUSTRIAL APPLICATIONS (Vols. II & III)
By Frederick Marchionna
Bibliography of latex patents and literature from June, 1932 to January, 1937; rubber derivatives to January, 1937. Price: $20.00
(Combination Price, Vols. I, II and III: $30.00)

Published by

THE RUBBER AGE

250 West 57th St. New York City

CONSIDER THE GIRAFFE

Nature helped the giraffe to reach things easily — quickly.

We, at the Hotel McAlpin in New York, have taken the tip and built our hotel convenient to everything and everywhere.

Only 1 block from Pennsylvania Station. About 5 minutes from Grand Central Station and to Times Square. Largest department stores across the street. Express subways downstairs. B. & O. Motor Coaches stop at our door. Truly, the McAlpin is "A Great Hotel."

Rooms with private bath
From $3.30 single. From $4.95 double

HOTEL McALPIN
BROADWAY AT 34TH STREET, NEW YORK
Under KNOTT Management
JOHN J. WOELFLE, Manager

and closes the pilot valve. When it opens it unbalances the pressure over the main valve disc and it opens and remains open until the pilot valve is closed. The whole cycle of operation is almost instantaneous. The power control valve opens exactly at the popping pressure and it closes cleanly with an extremely low blow-down. High superheat temperatures have no effect on its action. It may be operated manually from the control station.

The new valve is not intended to replace the spring-loaded safety valve, but rather it is a supplementary operating valve, designed to conserve power and increase the efficiency of the steam generating plant.

Shaler Cable Splicing Vulcanizer

A cable splicing vulcanizer for use in vulcanizing rubber over spliced wire in electric cables has been developed by the Shaler Co., Waupun, Wisconsin. The vulcanizer consists of two of the company's standard A362 vulcanizers, ordinarily used for making spot repairs on tires, and a set of aluminum mold blocks. A large "C" clamp is furnished to accommodate the cable and to provide pressure. The mold blocks are engraved or cut out in a design to accommodate the size and shape of the cable. They are of such thickness that a cable up to 2 inches in diameter can be properly vulcanized and are available in sizes up to 4 x 11 inches. Unless otherwise specified, these vulcanizers are wired for use on 110 volt A.C. 60 cycle current.

A line of **brushes** for rolling the beads or reinforcements on opening of rubber products, stripping the finished product from its form or mold, and applying glycerine to prevent rubber from sticking to the form or mold, made with nylon bristles, has been introduced by the Herold Manufacturing Co., Cleveland, Ohio.

ADVERTISEMENT

Santa never grows older. He must use HYCAR. It resists aging better.

See page 227

KOSMOS
DIXIE 20

KOSMOS
DIXIE 20

REVIEWS

BOOKS

Plastic Molding. By D. A. Dearle. Published by Chemical Publishing Co., Inc., 236 King St., Brooklyn, N. Y. 5½ x 8½ in. 130 pp. $4.00.

This book is devoted solely to the practical aspects of manufacturing plastic products. In layman English the author discusses the history of plastics, various materials available, molding technique, finishing operations, presses, accessory equipment and plant layout, estimates and costs, engineering and design and production management. Completing the "course," as the author terms it, he discusses merchandising plans for finished products and offers suggestions for making quotations on competitive work. Review questions appear at the end of each chapter. A subject index is included.

•

Buyers Guidebook Number: 1941-42. Tradepress Publishing Corp., 522 Fifth Ave., New York City. 8¾ x 11½ in. 736 pp. $1.50.

This is the seventeenth annual revised edition of the Guidebook issued by *Chemical Industries*. Like previous editions, it carries up-to-date data on chemical prices, trade and technical associations, raw materials, chemicals and specialties, consultants, etc. It also includes an index of brands, trade names and synonyms. The current edition contains two new sections, one devoted to technical data and the other a buying guide on equipment and containers. The chemical process industries will find the book an invaluable guide.

BOOKLETS, CATALOGS, Etc.

Moisture Characteristics of Carbon Black. By Stuart V. Stoddard and Chester P. Baker. Published by Dept. of Chemical Engineering, Northeastern University, 360 Huntington Ave., Boston, Mass. 5¾ x 8¾ in. 16 pp.

The results of investigations on the amount of moisture present in carbon black throughout the common range of atmospheric humidities and the rates of sorption and desorption from high to medium and low relative humidities are given in this booklet. A single grade of pelletized rubber black was used throughout. Equipment used is illustrated, methods of tests are outlined, and conclusions drawn are given.

•

Vansul Color Chart. Vansul, Inc., Englewood, N. J. 8½ x 11 in. Looseleaf.

This is a revised edition of the company's color charts, and, like previous editions, it contains numerous samples of the several colors developed by Vansul for use in rubber manufacture and allied lines. Data on curing, light, migration and bleeding is given in all cases. For convenience, a master batch color chart is included.

•

The Ford Rubber Plantations. Ford Motor Co., Dearborn, Mich. 8 x 5 in. 36 pp.

This booklet tells the story of the development of the Ford plantations in Brazil in picture form. The pictures, taken before and after, as well as the brief text, give an excellent idea of the problems which were involved in the vast project, as well as the methods by which they are being brought to a successful conclusion.

REPLACE FATTY ACIDS WITH PARA LUBE + SL-20 (EQUAL PARTS)

PARA LUBE + SL-20. A striking development in the manufacture of rubber products! This effective combination does the job of fatty acids better and more economically . . . another C. P. Hall contribution to the industry. "Para Lube plus SL-20" is already being successfully used by manufacturers who have found that **(1) it costs less to use; (2) it insures cleaner and quicker "knockout"; (3) it gives maximum number of cures per mold cleaning.** Try Para Lube plus SL-20 in place of fatty acids in your compounds, and note the improved results.

The C. P. Hall Co.
CHEMICAL MANUFACTURERS
AKRON • BOSTON • LOS ANGELES • CHICAGO

ZOPHAR

WAXES and COMPOUNDS

• For blending in molded rubber goods. Wax hardeners and softeners and waxes to be used as lubricants to prevent tackiness while rubber is being worked or to prevent adhesion to molds.

Our laboratories and wax experience are at your command to solve your problems.

ZOPHAR MILLS, Inc.

110-26th ST. BROOKLYN, N. Y.

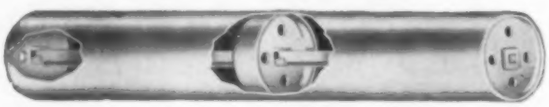
FOUNDED 1846

New and Better

GAMMETER'S

ALL STEEL ALL WELDED

CALENDER STOCK SHELL



4" - 5" - 6" - 8" - 10" - 12" diameters, any length.

Besides our well known Standard and Heavy Duty Constructions, we can supply light weight drums made up to suit your needs.

THE W. F. GAMMETER COMPANY

CADIZ, OHIO

Let us estimate on your

CUTTING DIES

• Years of experience making dies of all kinds for rubber manufacturers enable us to offer you correctly designed dies of tempered steel which retain their cutting edges....*Send blue print for quotation.*

BROCKTON CUTTING DIE & MACHINE CO. INC.

CUTTING AND PERFORATING DIES

AVON, MASS.

RMP

for

RED RUBBER

ANTIMONY

• ATTRACTIVE

• NON-DETERIORATING

RARE METAL PRODUCTS CO.

BELLEVILLE, N. J.

REVIEWS (CONT'D)

Albert Rubber Mill Equipment. L. Albert & Son, Trenton, N. J. 8½ x 11 in.

This is a new catalog listing some of the new and rebuilt machinery offered to the rubber industry by the company. Loose-leaf, it consists of a number of catalog pages and pamphlets, each describing some different piece of apparatus. Banburys, calenders, mills, tubers, presses and vulcanizers are described and illustrated. The catalog is virtually a complete directory of rubber machinery and equipment.

•

Management in Transition. American Management Association, 330 West 42nd St., New York City. 6 x 9 in. 32 pp.

This booklet, actually the latest annual report of the American Management Association, is divided into four parts, *i.e.,* Management's Perspective, The Work of Management Today, The Men of Management, and Current Activities of the A.M.A. Five handicaps to management in general, brought about by the defense program, are outlined and discussed.

•

Blaw-Knox Equipment and Complete Plants for the Process Industries. (Bulletin No. 1830). Blaw-Knox Co., Pittsburgh, Penna. 8¼ x 11 in. 16 pp.

This catalog contains a review of the company's scope and facilities in the process industries. It includes descriptions and illustrations of recently developed items of chemical process equipment. Handling and unloading plants for liquefied gases are described and attention is drawn to the company's facilities for manufacturing high pressure-high temperature piping.

•

Tag Chart Catalog No. 1230. C. J. Tagliabue Mfg. Co., Park and Nostrand Avenues, Brooklyn, N. Y. 8½ x 11 in. 32 pp.

As indicated by the title, this catalog illustrates and gives data on the various charts offered by the company, including 12-inch combination charts, 12-inch mercury and gas-filled ranges and charts, 10-inch vapor tension ranges and charts, and 10-inch pressure-vacuum charts. Printed in light green ink, the features of each chart are clearly indicated.

ADVERTISEMENT

Santa should try HYCAR for resistance to swelling.

See page 227

What You Should Know About Shellac. By J. R. Stewart and C. R. Cornthwaite. Issued by Stewart Research Laboratory, 1340 New York Ave., N. W., Washington, D. C. 8½ x 11 in. 18 pp. $1.00.

Issued in the nature of a research project report, the first of a series planned by the Stewart Research Laboratory, this pamphlet, consisting of 18 mimeographed pages bound in a legal size cover, treats with the origin, preparation, prices, uses, etc., of shellac. It is intended as an unbiased guide, elementary in nature, for all users of shellac. Fourteen advantages and 10 disadvantages of shellac are listed. The price situation is also discussed.

•

Aminco Rubber Testing Instruments. (Catalog No. 9). American Instrument Co., 8010 Georgia Ave., Silver Spring, Maryland. 8½ x 11 in. 16 pp.

This new catalog describes instruments and apparatus featured by the company for making chemical and physical tests of rubber and rubber-like materials according to Federal, A.S.T.M. and other standards. Included among the instruments described and illustrated are grinders for buffing rubber specimens, abraders, accelerated agers, cold flow testing apparatus, permanent set apparatus and compression set apparatus. An extensive explanation of the operation of the Aminco-Yerzley oscillograph is also included.

•

Fleet Operators Tire Service Manual. Published by *Tire Rebuilders News*, 381 Fourth Ave., New York City. 8½ x 11 in. 48 pp. 50c. Special prices on quantities.

Facts and figures on tire purchasing, care, treading and repair appear in this specially compiled manual. The proper selection of tires for maximum service and overloads is discussed, the case for treading is presented, and proof that treading pays is given. The treading experience of over 200 large fleets is given in condensed form. The manual should prove of interest not only to fleet operators but to dealers and retreaders as well.

ADVERTISEMENT

Try HYCAR, Madame. It resists abrasion better.

See page 227

HARMON COLORS
for RUBBER MANUFACTURE

• *Are Bright in Shade*
• *Fast in Cure*

Made by a new patented solvent process in a new form—

ORGANIC
RUBBER COLOR
GRANULES

• *Easy to weigh* • *Easy to disperse*
• *Economical* • *Will not dust or fly*

HARMON COLOR WORKS, INC.
PATERSON, N. J.
Los Angeles Agent
Roberts-Davis Co., 1104 N. Detroit St.
"Harmon-ize With Harmon Colors"

Testing Insures Quality

Adequate testing is "Quality Insurance," in your purchases and products. Save time, money and mistakes with *Scott Testers, made in 60 models for tensile, flexing, friction (adhesion), plasticity, hysteresis, state of cure, compression cutting, etc.; 1 gram to 1 ton.

SCOTT TESTERS
*Registered Trademark

HENRY L. SCOTT CO. 101 Blackstone St. Providence, R. I.

The CARTER BELL MFG CO
CARTER BELL STANDARD SINCE 1903 RUBBER SUBSTITUTES
Springfield New Jersey

MARKETS

Rubber – Crude, Reclaimed and Scrap – Cotton – Ducks – Tire Fabrics – Sheetings

NEW YORK, DECEMBER 9, 1941

Crude Rubber

ACTIVITY in the actual free rubber market for the past month has been practically stagnant, with occasional small lots being moved to small rubber manufacturers. The price held steady at 23⅛ cents, with some inquiries reported but few offerings. With the outbreak of hostilities in the Pacific, dealers and importers have already reconciled themselves to doing even less business in whatever free rubber remains. The apparent apathy also extended to the Commodity Exchange where transactions in remaining futures were few and far between. The crude rubber trade fully realizes that war in the Pacific, with resulting drastic curtailment of rubber production, at least temporarily, in this country, means that its activities will be almost completely restricted. But those dealers and others who recall the former war years of 1914 to 1918 realize that the government will do all in its power to maintain the trade as intact as possible and accordingly will patiently await developments. Quotations in the outside market follow:

As of December 9

Plantations—

Ribbed Smoked Sheets—

No. 1 Spot	—	@	.24
No. 2	—	@	.23¾
No. 3	—	@	.23½
No. 4	—	@	.23
Thin Latex Crepe	—	@	.26
Thick Latex Crepe	—	@	.26
Brown Crepe, No. 1	—	@	.22½
Brown Crepe, No. 2	—	@	.22¼
Amber Crepe, No. 2	—	@	.22½
Amber Crepe, No. 3	—	@	.22¼
Brown Crepe, Rolled	—	@	.20½

Latex—

Normal, per lb., carload lots	—	@	.29¼

Paras—

Up-River, fine	.29	@	.30
Acre Bolivian, fine	.29	@	.30

Balata—

Brazilian block	—	@	.10

LONDON MARKET

(London Cable Temporarily Discontinued)

Scrap Rubber

Scrap rubber dealers reported extraordinary activity in recent weeks with the entire trade girding for the expected increased demand from reclaimers due to the outbreak of hostilities in the Pacific with its resultant sharp curtailment in the allotments of crude rubber to domestic manufacturers. Prices have increased on several grades since our last report. Current quotations follow:

(Prices to Consumers)

Auto tire peelings, ton	32.00	@33.00
Mixed auto, ton	16.50	@17.00
Beadless tires, ton	23.00	@25.00
Clean solid truck tires, ton	40.00	@44.00
Boots and shoes, ton	30.00	@32.00
Arctics, untrimmed, ton	24.00	@26.00
Inner tubes, No. 1, lb.	.12	@ .13
Inner tubes, No. 2, lb.	.07¾	@ .07⅞
Inner tubes, Red, lb.	.07¾	@ .07⅞

Reclaimed Rubber

No slackening in the demand for reclaim has been experienced since our last report. Based on the turn of events in the Pacific, reclaimers anticipate still greater demands in the early future and are making necessary preparations. Consumption of reclaim in October amounted to 25,009 long tons, or 41.4% of total crude rubber consumption reported for the same month. Prices on red tube reclaim have dropped slightly. Current quotations follow:

Shoe

Unwashed, lb.	.07	@	.07¼

Tube

No. 2 (Compounded), lb.	.10½	@	.13¼
Red Tube, lb.	.12½	@	.12¾

Tires

Black (acid process), lb.	.07½	@	.07¾
Black, selected tires, lb.	.06½	@	.06¾
Truck, Heavy Gravity, lb.	.08½	@	.08¾

Miscellaneous

Mechanical blends, lb.	.04½	@	.05½
White, lb.	.13½	@	.14½

Tire Fabrics

(Prices Net at the Mill)

Peeler, carded, 23/5/3, lb.	.43	@	.43¼
Peeler, carded, 23/4/3, lb.	.44	@	.44¼
Peeler, carded, 15/3/3, lb.	.41	@	.41¼
Peeler, carded, 15/4/2, lb.	.41	@	.41¼
Peeler, carded, 13/3/3, lb.	.40	@	.40¼
CHAFERS			
Carded, American, 1⅛", lb.	.43	@	.43½
Carded, American, 1", lb.	.39½	@	.48

Cotton

The price for middling uplands on the Cotton Exchange has swung in a 115 point range since our last report, high being 18.24 on December 5 and low 17.09 on November 24. The price hung around a 17.20 level in mid-November but started an upward movement toward the end of the month, largely as the result of renewed mill buying. Early this month the rise continued, reaching 18.24 on December 5, a new high for the current move, with extensive speculative interest featuring trading. The market remained steady after news of Japan's attacks in the Pacific, but war nervousness seems to have gripped the market at this writing and excessive liquidation resulted in a 48 point drop, from 18.23 on December 8 to 17.85 today (December 9). The Crop Reporting Board of the Department of Agriculture has forecast a crop of 10,976,000 bales for the 1941-42 season, this figure, the final estimate for the year, comparing with an estimate of 11,020,000 bales as of November 1, and a final yield of 12,556,000 bales from the 1940-41 crop. Quotations for middling uplands on the Exchange follow:

	Nov. 10	December 9		
	Close	High	Low	Close
December	16.23	16.75	16.37	16.49
March	16.43	17.25	16.52	16.71
July	16.51	17.37	16.64	16.80

Sheetings

48x40	36 in.	5.50	lb.	—	@ 7.091
40x40	36 in.	6.15	lb.	—	@ 6.341
40x36	36 in.	6.50	lb.	—	@ 6.000
48x48	40 in.	2.50	lb.	—	@14.600
48x48	40 in.	2.85	lb.	—	@12.807
56x60	40 in.	3.60	lb.	—	@10.833
48x44	40 in.	3.75	lb.	—	@10.000

Note: These are ceiling prices, and will remain as quoted as long as cotton is in the price range of 16.86 to 17.29.

Ducks

Enameling (single filling), lb.	.40	@	.44
Belting and Hose, lb.	.37½	@	.38
Single filling, A grade, lb.	.19	@	.20
Double filling, lb.	.20	@	.21

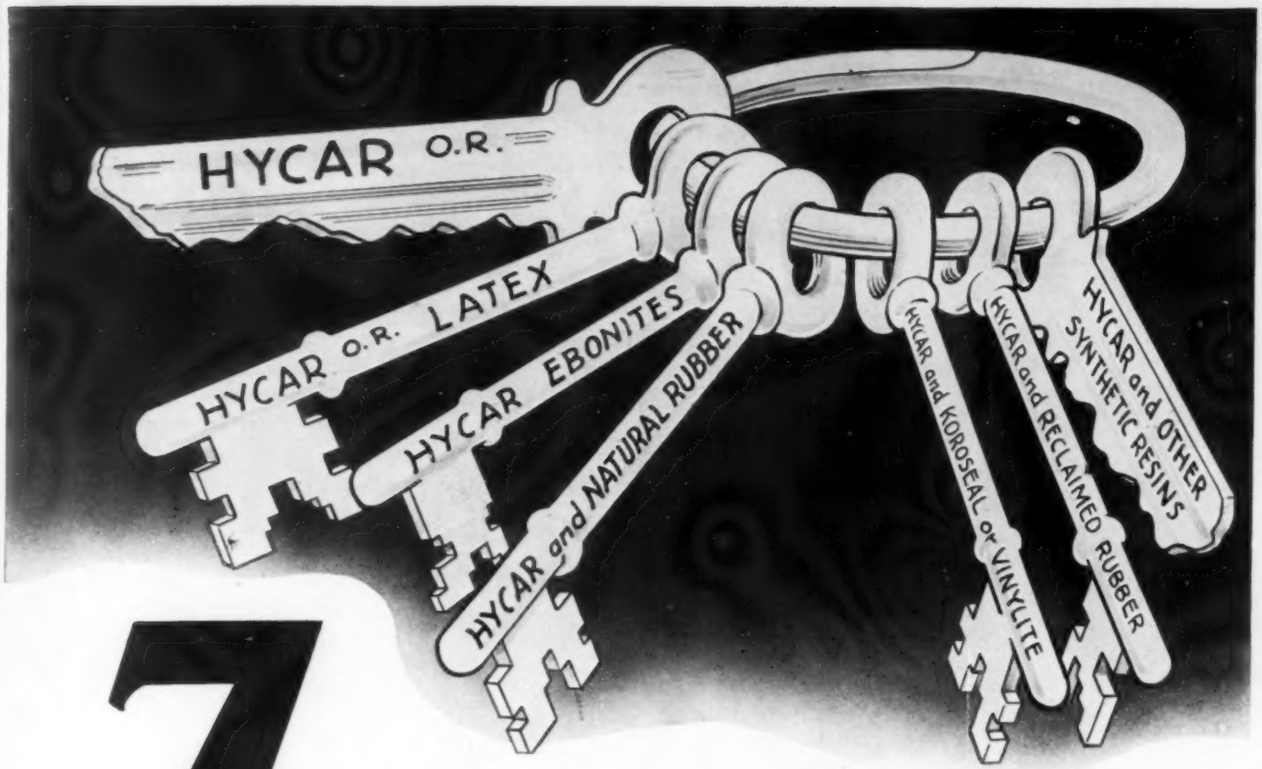
Closing Rubber Prices on New York Commodity Exchange, Inc.

"New" Standard Contract of 10 Tons

FROM NOVEMBER 12 TO DECEMBER 9

Date	Nov.	Dec.	Jan.	Feb.	Mar.	Sales
Nov. 12	——	22.50	22.35	——	22.35	——
13	——	22.50	22.35	——	22.35	——
14	——	22.50	22.35	——	22.35	——
15	——	——	——	——	——	——
16	——	——	——	——	——	——
17	——	22.50	22.35	——	22.35	——
18	——	22.50	22.35	——	22.35	——
19	——	22.50	22.35	——	22.35	6
20	——	——	——	——	——	——
21	——	22.50	22.35	——	22.35	2
22	——	——	——	——	——	——
23	——	——	——	——	——	——
24	——	22.50	22.35	——	22.35	1
25	——	22.50	22.35	——	22.35	1
26	——	22.50	22.35	——	22.35	3
27	——	22.50	22.35	——	22.35	——
28	——	22.50	22.35	——	22.35	——
29	——	——	——	——	——	——
30	——	——	——	——	——	——
Dec. 1	——	22.50	22.35	——	22.35	1
2	——	22.50	22.35	——	22.35	——
3	——	22.50	22.35	——	22.35	——
4	——	22.50	22.35	——	22.35	——
5	——	22.50	22.35	——	22.35	——
6	——	——	——	——	——	——
7	——	——	——	——	——	——
8	——	22.50	22.35	——	22.50	——
9	——	22.50	22.35	——	22.50	——

EDITOR'S NOTE: Trading in futures on the Exchange, suspended on August 13, was resumed on September 15, for the sole purpose of liquidating outstanding contracts under a maximum price of 22½ cents per pound.



7 KEYS TO PRIORITIES *and* PROSPERITY

HYCAR O. R.*—the All-American Synthetic Rubber that is doing an outstanding job in America's first line of defense, offers *you* its 7 KEYS TO PRIORITIES AND PROSPERITY so that you, too, may replace your lost commercial business with Defense Orders.

★ HYCAR O.R.
★ HYCAR O.R. LATEX
★ HYCAR EBONITES
★ HYCAR+NATURAL RUBBER
★ HYCAR+RECLAIMED RUBBER
★ HYCAR+KOROSEAL or VINYLITE
★ HYCAR+OTHER SYNTHETIC RESINS

Millions of HYCAR parts are being rushed into America's defense program and are demonstrating their superior resistance to oil, heat, aging and abrasion in battleships, bombers and tanks. HYCAR even is being substituted for copper, aluminum and steel for many important commercial uses.

HYCAR technicians are ready to assist you in any processing or compounding problem. Let them work with you to demonstrate the economies and qualities that may be obtained with HYCAR O.R.*

The ALL-AMERICAN SYNTHETIC RUBBER HYCAR OIL RESISTANT

HYCAR* CHEMICAL COMPANY

AKRON, OHIO

*Reg. U. S. Patent Office

YOU CAN PRODUCE BETTER GOODS MORE ECONOMICALLY WITH HYCAR O. R.

CHEMICAL MARKETS

New York, Dec. 9, 1941
All Prices F.O.B. Works

ACCELERATORS

Organic			
A-1 (Thiocarbanilid)	lb.	.26 @	.35
A-10	lb.	.34 @	.40
A-11	lb.	.52 @	.65
A-19	lb.	.52 @	.65
A-32	lb.	.70 @	.80
A-77	lb.	.42 @	.55
A-100	lb.	.42 @	.55
Aldehyde ammonia, crystals	lb.	.65 @	.70
Altax	lb.	.55 @	.60
Beutene	lb.	.70 @	.75
Butyl Zimate	lb.	— @	1.15
Captax	lb.	.50 @	.55
Crylene	lb.	.40 @	.47
Di-Ortho-Tolyguanidine	lb.	.44 @	.46
Diphenylguanidine	lb.	.35 @	.45
El-Sixty	lb.	.50 @	.65
Ethyl Zimate	lb.	— @	1.15
Ethylidene aniline	lb.	.42 @	.43
Formaldehyde aniline	lb.	.31 @	—
Guantal	lb.	.40 @	.50
Hepteen	lb.	.35 @	.40
Hexamethylenetetramine	lb.	.33 @	—
Lead Oleate, No. 999	lb.	.13 @	—
Witco	lb.	.15 @	—
Methyl Tuads	lb.	— @	1.55
Methyl Zimate	lb.	— @	1.25
Monex	lb.	— @	1.55
Phenex	lb.	.50 @	.55
Pip-Pip	lb.	— @	1.90
R & H 50-D	lb.	.42 @	.43
R-2	lb.	1.40 @	1.80
R-2 Crystals	lb.	2.50 @	2.75
RN-2	lb.	1.40 @	1.80
RN-2 Crystals	lb.	1.90 @	2.15
Rotax	lb.	.60 @	.65
Safex	lb.	1.20 @	1.30
SPDX	lb.	.70 @	.75
Super-Sulphur No. 1	lb.	.50 @	—
No. 2	lb.	.14 @	.16
Thiocarbamilid, drums	lb.	.26 @	.35
Thiurad	lb.	— @	1.75
Trimene	lb.	.55 @	.65
base	lb.	1.05 @	1.20
Triphenylguanidine	lb.	.45 @	—
Ulto	lb.	1.25 @	1.75
Ureka	lb.	.60 @	.75
Blend B	lb.	.60 @	.75
Blend C	lb.	.56 @	.65
Vulcanex	lb.	.42 @	.43
Vulcanol	lb.	.85 @	—
Inorganic			
Litharge, domestic	lb.	.07 @	.07½
Magnesia, calcined, heavy	lb.	.04 @	—

COLORS

Blacks (See Next Column)			
Blues			
Prussian	lb.	.36 @	—
Ultramarine	lb.	.16 @	.27
Browns			
Mapico	lb.	.11 @	—
Umber, Turkey	lb.	.05 @	.06½
Greens			
Chrome	lb.	.23 @	.32
Guignet's Green	lb.	.70 @	—
Reds			
Antimony crimson, 15/17	lb.	— @	—
sulfur, free	lb.	— @	—
Indian	lb.	.08¾ @	—
Domestic (Maroon)	lb.	.11 @	—
Mapico	lb.	.09¾ @	—
Red oxide, pure	lb.	.10 @	.12
Rub-Er-Red	lb.	.09¼ @	—
Whites			
Cryptone No. 19	lb.	.05¼ @	.05½
Cryptone CB No. 21	lb.	.05¼ @	.05½
Cryptone ZS-86	lb.	.07¾ @	.08
Cryptone ZS-230	lb.	.07¾ @	.08
Cryptone ZS-800	lb.	.07¾ @	.08
Lithopone:			
Albalith	lb.	.0385 @	.0410
Azolith	lb.	.0385 @	.0410
Ray-bar	lb.	.05½ @	.05¾
Ray-cal	lb.	.05½ @	.05¾
Rayox	lb.	.14½ @	.15¼
Titanox A	lb.	.13½ @	.13¾
Titanox B	lb.	.05½ @	.05¾
Titanox C	lb.	.05¾ @	.05½
Zinc Oxide—American Process			
American Azo:			
ZZZ (lead free)	lb.	.06½ @	.06¾
Anaconda, lead free	lb.	.06½ @	.06¾
Horsehead Lead Free Brand:			
Special—3	lb.	.06½ @	.06¾
XX Red—4	lb.	.06½ @	.06¾
XX Red—72	lb.	.06½ @	.06¾
XX Red—78	lb.	.06½ @	.06¾
XX Red—103	lb.	.06½ @	.06¾
Kadox, black label—15	lb.	.06½ @	.06¾
Red label—17	lb.	.06½ @	.06¾
St. Joe, black label	lb.	.06½ @	.06¾
green label	lb.	.06½ @	.06¾
red label	lb.	.06½ @	.06¾
U. S. P.—7, bbls.	lb.	.09½ @	.09¾
Zinc Oxide—French Process:			
Florence White Seal—7 bbls.	lb.	.08½ @	.08¾
Green seal—8	lb.	.08 @	.08¼
Red seal—9	lb.	.07½ @	.07¾
Yellows			
Cadmolith	lb.	.50 @	.55
Chrome	lb.	.16 @	—
Mapico	lb.	.06¾ @	—

BLACKS

(In bags, carload lots)

Aerfloted Arrow		.0535 @	—
Certified		.0335 @	—
Certified Spheron		.0335 @	—
Continental		.0335 @	—
Disperso		.0335 @	—
Dixiedensed		.0335 @	—
Dixiedensed 66		.0335 @	—
Excello		.0335 @	—
Furnex		.03 @	—
Furnex Beads		.03 @	—
Gastex		.03 @	—
Kosmobile		.0335 @	—
Kosmobile 66		.0335 @	—
Micronex (Amarillo)		.0335 @	—
Micronex Beads (Amarillo)		.0335 @	—
Pelletex		.03 @	—
P-33		.0475 @	—
Shell Carbon (Delivered Midwest)		.024 @	—
Supreme		.0335 @	—
Thermax		.0225 @	—
Wyex		.0335 @	—

COMPOUNDING MATERIALS

Aluminum Flake	ton	21.85 @	24.50
Asbestine	ton	14.00 @	18.00
Barium carbonate (98-100%)	ton	47.00 @	49.00
Barytes	ton	22.85 @	31.50
Bentonite	ton	11.00 @	16.00
Blanc fixe, dry	ton	60.00 @	67.50
Calcene	ton	37.50 @	43.00
Catalpo (fact.)	lb.	.02 @	—
Chalk, precipitated			
Suprex white, extra lt.	ton	45.00 @	60.00
heavy	ton	45.00 @	55.00
Clay, Aerfloted, Suprex	ton	10.00 @	22.00
Crown (f.o.b. plant)	ton	10.00 @	—
Dixie	ton	10.00 @	22.50
Langford	ton	— @	7.50
McNamee	ton	10.00 @	22.50
Par	ton	— @	10.00
Witco	ton	10.00 @	—
Cotton Flock (Dark)	lb.	.10½ @	.13
Kalite No. 1	ton	26.00 @	52.00
Kalite No. 3	ton	36.00 @	62.00
Kalvan	ton	100.00 @	126.00
Magnesium carbonate	lb.	.06¼ @	.09¾
Mica	ton	35.00 @	44.00
Mineralite	ton	— @	30.00
Pyrax A	ton	7.00 @	20.00
Rottenstone (powd. Dom.)	ton	25.50 @	37.50
Rubberol	lb.	.16 @	.16½
Silene (calcium silicate)	lb.	.04 @	.045
Starch, powdered	cwt.	2.90 @	4.10
Talc, domestic	ton	17.00 @	25.00
Whiting, commercial	ton	16.00 @	26.00
Columbia Filler	ton	9.00 @	14.00
Witco	ton	6.00 @	—
Wood Flour (100 mesh)	ton	30.00 @	32.00

MINERAL RUBBER

285°-300° Mineral Rubber	ton	22.00 @	—
Black Diamond	ton	25.00 @	—
Genasco, solid (factory)	ton	— @	—
Hard Hydrocarbon	ton	25.00 @	42.00
Parmr, solid	ton	— @	—
Pioneer, MR, solid	ton	— @	—

MISCELLANEOUS

Aromatics—Rodo #0	lb.	4.00 @	4.50
Rodo #10	lb.	5.00 @	5.50
Curodex 19	lb.	2.75 @	—
Curodex 188	lb.	3.50 @	—
Curodex 198	lb.	4.50 @	—
Para-Dors	lb.	4.50 @	—
Aresklene No. 375 (dispersing, wetting and penetrating agent)	lb.	.35 @	.50
Darvan (dispersing agent)	lb.	.30 @	.39
Santomerse S (dispersing, wetting, penetrating and stabilizing agent)	lb.	.11 @	.25
Sponge Paste	lb.	— @	.18
Sunproof	lb.	.23 @	.28
Tackol (tackifier)	lb.	.085 @	.18
Tonox	lb.	.52 @	.61
Ty-Ply R (and S)	gal.	6.75 @	8.75
Unicel (blowing agent)	lb.	.50 @	—

SOFTENERS

Acids			
Acetic, 28%, bbls.	100 lb.	3.18 @	3.43
Nitric, 36 degrees	cwt.	5.00 @	5.95
Acids, Fatty			
Laurex	lb.	.15 @	.17½
SL #10	lb.	.12 @	.14
Stearex Beads	lb.	.10 @	.11
Stearic, double pressed	lb.	.12½ @	.13½
Stearite	lb.	.10 @	—
Alkalies			
Caustic Soda, 76%	cwt.	2.70 @	5.70
Soda Ash, 58%	cwt.	1.15 @	2.98
Oils			
Cycline Oil	gal.	.14 @	.20
Degras, bbls.	lb.	.08¾ @	.09½
Fluxrite	lb.	.05½ @	.06½
Para-Flux	gal.	.08½ @	.18
Para-Lube	lb.	.425 @	.48
Petrolatum, amber	lb.	.03½ @	.04½
Pigmentaroil, tank cars.	gal.	.16 @	—
in drums	gal.	.22½ @	.23½
Pine, steam distilled	gal.	.65 @	1.00
Rosin Oil, cmpd.	gal.	.40 @	—
Rubberol	lb.	.13½ @	.14
Rubtack	lb.	.10 @	—
Seedine, c.l.	lb.	.07¼ @	—
Tackol	lb.	.08½ @	.18
Witco Palm Oil	lb.	— @	—
Witco Softener No. 20.	gal.	.20 @	—
Woburn No. 8, c.l.	lb.	.06 @	—
Resins and Pitches			
Pitch, Burgundy	lb.	.05½ @	.06
coal tar	ton	19.00 @	22.00
hardwood	ton	16.00 @	22.50
pine, 200 lb. gr. wt.	bbl.	6.00 @	6.50
Pigmentar, tank cars.	gal.	.16 @	—
in drums	gal.	.22½ @	.23½
R. S. L. Resin	lb.	— @	—
Retort Pine Tar, drums.	ton	20.00 @	26.00
Solvents			
Acetone, pure	lb.	.07 @	.09
Benzene, 90%, tank car.	gal.	.14 @	—
Beta-Trichlorethane	gal.	— @	.20
Bondogen	lb.	.98 @	1.25
Carbon, bisulfide	lb.	.05 @	.08½
Carbon tetrachloride	gal.	.73 @	1.27
Dichlorethylene	lb.	— @	—
Dipentene, cml., drums.	gal.	.38 @	.50
Ethylene dichloride	lb.	.07½ @	.08½
Plastogen	lb.	.07¾ @	.12
Reogen (drums)	lb.	.11½ @	.23
Rub-Sol	gal.	.09½ @	—
Trichlorethylene	lb.	.08 @	.09¼
Turpentine, spirits	gal.	.80 @	.84
dest. dist., drums.	gal.	.55 @	.65
Waxes			
Beeswax, white	lb.	.56 @	.58
Carnauba, yellow	lb.	.84 @	.88
Ceresin, white, dom.	lb.	.12½ @	.17
Montan, crude	lb.	.45 @	.46
Paraffin			
Yellow crude scale, 124/126	lb.	.04¼ @	—
Refined, 123/125	lb.	.05¼ @	—

ANTI-OXIDANTS

Agerite Alba	lb.	2.00 @	2.15
Exel	lb.	1.00 @	1.02
Gel	lb.	.57 @	.59
Hipar	lb.	.65 @	.67
Powder	lb.	.52 @	.54
Resin	lb.	.52 @	.54
Resin D	lb.	.52 @	.54
White	lb.	1.25 @	1.40
Albasan	lb.	.70 @	.75
Antox	lb.	— @	.56
B-L-E	lb.	.52 @	.61
Flectol B	lb.	.52 @	.65
Flectol H	lb.	.52 @	.65
Flectol White	lb.	.90 @	1.15
Neozone A, B, C, D, E	lb.	.52 @	.63
Oxynone	lb.	.77 @	.90
Retardex	lb.	.45 @	.48
Santoflex B	lb.	.52 @	.65
Santovar A	lb.	1.15 @	1.40
S.C.R.	lb.	.33 @	.35
Stabilite	lb.	.52 @	.54
Stabilite Alba	lb.	.70 @	.75
VGB	lb.	.52 @	.61

LUBRICANTS—MOLD & RUBBER SURFACE

Aresklene	lb.	.35 @	.50
Cocoa Soapstock	lb.	.06 @	.08
Colite	gal.	.90 @	1.15
Dipex	lb.	.06 @	.08
Glycerized Liquid Lubricant	gal.	1.15 @	1.20
Lubrex	lb.	.25 @	.30
Mineralite	ton	— @	30.00
Mold Paste	lb.	.12 @	.18
Sericite	ton	65.00 @	75.00
Soap Tree Bark, cut, sifted	lb.	.06 @	.08

FACTICE OR RUBBER SUBSTITUTES

Amberex	lb.	.25 @	—
Amberex Type B	lb.	.18¾ @	—
Black	lb.	.08 @	.12
White	lb.	.08½ @	.13½
Brown	lb.	.08 @	.11½
Neophax A	lb.	.119 @	—

VULCANIZING INGREDIENTS

Dispersed Sulfur No. 2	lb.	.08 @	.12
Sulfur Chloride, yellow (drs.)	lb.	.03 @	.08
Sulfur, rubber makers			
Refined (bags)	cwt.	2.40 @	—
Commercial (bags)	cwt.	2.05 @	—
Telloy	lb.	1.75 @	—
Vandex	lb.	1.75 @	—

STATISTICS

Crude Rubber — Latex & Guayule — Reclaim — Tires & Tubes — Automobiles — Rims — Gasoline — Cotton Prices

U. S. Imports and Exports of Crude Rubber

YEARS	Gross Imports: Long Tons	Gross Imports: Total Declared Value	Gross Imports: Average Declared Value per pound Cents	Re-exports: Long Tons	Re-exports: Total Declared Value	Re-exports: Average Declared Value per pound Cents	Net Imports: Long Tons
1924	325,899	173,367,272	23.75	10,309	6,057,637	26.23	315,590
1925	393,370	426,167,504	48.36	14,827	19,847,753	59.76	378,543
1926	409,944	501,131,064	54.57	17,671	22,470,583	56.77	392,273
1927	424,733	338,688,492	35.60	27,775	24,735,488	39.76	396,958
1928	432,633	242,727,423	25.05	32,159	18,128,761	25.17	400,474
1929	560,082	239,177,811	19.06	36,485	16,868,718	20.64	523,597
1930	482,083	139,133,048	12.88	30,205	9,310,205	13.76	451,878
1931	497,176	72,922,845	6.55	25,595	4,255,572	7.42	471,581
1932	409,556	31,936,459	3.48	20,930	2,015,612	4.30	388,626
1933	407,817	44,034,064	4.82	20,537	2,601,352	5.65	387,280
1934	449,513	97,929,676	9.73	23,848	5,770,109	10.80	425,665
1935	453,134	115,299,448	11.36	11,389	3,084,331	12.09	441,745
1936	467,064	152,072,496	14.54	12,581	4,488,223	15.93	454,483
1937	574,600	237,307,041	18.44	7,902	3,385,433	19.02	566,698
1938	397,620	125,357,730	14.07	5,652	1,799,124	14.21	391,968
1939	469,803	167,558,245	15.92	13,125	5,832,618	19.84	456,678
1940	780,820	303,117,726	17.33	7,060	3,197,136	20.22	773,760
1940:							
Sept.	75,770	29,317,540	17.27	666	349,443	23.43	75,104
Oct.	73,179	27,975,598	17.07	316	123,216	17.38	72,863
Nov.	69,844	26,917,136	17.21	126	52,020	18.45	69,718
Dec.	94,172	36,369,973	17.24	205	94,422	20.52	93,967
1941:							
Jan.	84,201	33,370,482	17.69	292	138,009	21.11	83,909
Feb.	70,745	28,469,753	17.97	327	144,139	19.69	70,418
Mar.	84,991	34,030,846	17.88	329	163,375	22.19	84,662
Apr.	61,288	24,193,639	17.62	238	99,371	18.96	61,054
May	98,438	39,537,574	17.93	370	204,865	24.72	98,068
June	62,124	25,179,498	18.09	476	257,254	24.13	61,648
July	94,622	39,296,581	18.54	423	219,597	23.17	94,199
Aug.	104,057	44,101,058	18.92	973	488,299	22.40	103,084
Sept.	79,212	33,045,295	18.62	749	402,036	23.96	78,463

Note: "Gross Imports" do not include latex or guayule. To secure more accurate figures for "Net Imports" latex and guayule figures (shown below) should be added and the re-export figure deducted from the total. Annual figures for 1924-36 were revised in February, 1937.

United States Imports of Guayule, Balata, Jelutong, Liquid Latex

(All Quantities in Long Tons)

	Guayule Tons	Guayule Dollars	Balata Tons	Balata Dollars	Jelutong Tons	Jelutong Dollars	Liquid Latex (1) Tons	Liquid Latex (1) Dollars
1924	1,356	536,392	464	568,456	6,165	1,237,100	2,157	864,059
1925	3,781	1,803,448	517	374,750	6,749	1,642,531	3,272	3,537,510
1926	4,305	2,562,096	354	327,213	7,263	3,127,757	3,394	4,686,743
1927	5,018	3,674,957	582	477,246	7,785	2,448,657	1,495	1,170,650
1928	3,077	1,755,685	731	430,855	7,552	2,540,059	4,007	2,121,786
1929	1,275	545,175	728	566,964	8,304	2,458,126	3,729	1,788,391
1930	1,096	347,388	502	422,684	5,907	1,403,244	4,458	1,508,786
1931	....	.....	1,207	411,380	5,777	1,019,010	4,675	888,909
1932	....	.....	707	147,403	4,607	616,596	5,112	601,999
1933	...	.....	1,659	2,261,869	5,990	944,895	11,085	1,833,671
1934	398	75,349	1,054	438,309	4,987	943,752	13,107	3,643,221
1935	459	86,835	615	188,384	5,644	1,063,126	13,553	3,782,222
1936	1,229	286,552	535	199,368	6,163	1,296,364	19,852	6,659,899
1937	2,694	745,873	354	151,344	7,109	2,017,786	23,185	10,213,670
1938	2,485	623,819	509	181,140	9,132	2,944,504	11,878	4,147,318
1939	2,232	463,345	694	265,553	6,640	1,603,418	27,438	10,467,552
1940	3,634	758,007	648	300,500	7,451	2,449,137	33,789	14,593,466
1940:								
Sept.	250	49,845	40	19,245	712	246,641	2,953	1,337,487
Oct.	381	77,286	70	38,092	1,150	382,168	1,156	512,153
Nov.	392	78,587	67	43,939	445	152,297	2,308	1,169,086
Dec.	278	62,586	54	39,471	1,102	341,876	3,534	1,539,957
1941:								
Jan.	447	104,128	57	32,910	698	221,911	2,184	1,019,741
Feb.	283	65,942	41	22,790	768	245,732	2,946	1,279,648
Mar.	426	98,187	36	16,147	715	258,514	1,707	774,225
Apr.	423	95,916	64	18,533	514	189,520	1,594	648,217
May	334	76,414	61	44,381	822	287,249	2,632	1,117,226
June	383	86,949	67	30,470	552	179,779	2,070	936,944
July	411	94,874	100	34,119	830	215,176	2,049	930,126
Aug.	499	111,502	41	19,344	159	50,934	1,984	779,079
Sept.	330	79,054	114	38,632	437	140,412	3,609	1,795,345

(1) Weight given in pounds of dry rubber contained in latex.
Note: Annual figures for 1924-1936 revised on basis of information received on February 8, 1937.

U. S. Consumption of Crude Rubber

(Including Latex)

	1934	1935	1936	1937	1938	1939	1940	1941
	Figures on Monthly Basis							
Jan.	39,190	46,636	48,631	50,879	31,265	47,387	58,061	65,989
Feb.	40,515	42,720	36,841	51,950	25,357	43,422	52,078	62,692
Mar.	47,003	42,153	42,813	54,129	32,389	51,416	52,454	69,024
Apr.	44,853	44,247	52,031	51,859	29,730	45,268	52,361	71,374
May	42,918	41,101	50,612	51,795	30,753	45,484	54,513	71,365
June	40,147	36,156	52,772	51,860	32,540	48,438	47,834	84,912
July	32,553	35,917	48,250	43,703	34,219	44,975	48,354	68,653
Aug.	33,216	38,775	46,777	41,506	40,552	51,740	53,307	55,365
Sept.	30,258	37,086	46,449	43,945	40,183	51,402	52,469	53,655
Oct.	31,253	41,969	49,637	38,754	42,850	57,155	59,644	60,418
Nov.	34,748	42,310	50,433	34,025	49,050	55,677	57,716	
Dec.	36,569	42,474	49,754	29,195	48,143	49,636	59,709	
Tot.	453,223	491,544	575,000	543,600	437,031	592,000	648,500	

Note: The above figures are based on the annual surveys conducted by the Leather and Rubber Division, Bureau of Foreign & Domestic Commerce, Washington, D. C., with the exception of those for the current year which are estimates made by the Rubber Manufacturers Association. They are revised frequently and the latest available issue should always be consulted for the most reliable figures.

Reclaimed Rubber in the United States

(All Quantities in Long Tons)

Year	Production	Consumption Tons	Consumption % to Crude	Stocks	Year	Production	Consumption Tons	Consumption % to Crude	Stocks
1931	129,690	123,000	35.1	21,714	1936	150,571	141,486	24.6	19,000
1932	75,656	77,500	23.3	16,334	1937	185,033	162,000	29.8	28,800
1933	93,587	85,000	21.2	17,780	1938	122,400	120,800	29.9	23,000
1934	108,162	100,855	22.3	20,000	1939	186,000	170,000	28.7	25,250
1935	122,948	117,523	23.9	17,000	1940	208,971	190,244	29.3	32,636
	Figures on Monthly Basis								
1940:									
Jan.	19,239	16,341	28.1	27,089	July	14,299	14,539	30.1	27,129
Feb.	17,938	15,629	30.0	27,962	Aug.	17,161	14,464	27.1	28,526
Mar.	17,182	16,200	30.9	27,524	Sept.	16,379	14,835	28.3	29,039
Apr.	16,518	16,573	31.7	26,492	Oct.	19,300	16,807	28.2	30,816
May	17,499	15,984	29.3	27,141	Nov.	17,636	16,312	28.3	31,459
June	16,581	15,163	31.7	27,701	Dec.	19,239	17,397	29.1	32,636
1941:									
Jan.	20,413	19,086	28.9	33,380	July	23,111	21,725	31.6	36,751
Feb.	19,306	18,222	29.1	33,654	Aug.	24,111	20,864	38.7	39,099
Mar.	22,006	19,611	28.4	35,028	Sept.	24,678	24,032	44.8	38,055
Apr.	21,574	20,427	28.6	35,336	Oct.	26,560	25,009	41.4	38,604
May	22,775	21,405	30.0	35,871	Nov.	.....	.....	...	.....
June	23,790	22,559	26.6	36,265	Dec.	.....	.....	...	.....

Note: The above figures are based on the annual surveys conducted by the Leather and Rubber Division, Bureau of Foreign & Domestic Commerce, Washington, D. C., with the exception of those for the current year which are estimates made by the Rubber Manufacturers Association. They are revised frequently and the latest available issue should always be consulted for the most reliable figures. The annual figures are more accurate. Stocks shown are those on hand at the end of the indicated month or year.

U. S. Consumption of Gasoline

(Bureau of Mines Statistics)
(In Thousands of Barrels of 42 Gallons)

	1939*	1940	1941*		1939*	1940	1941
January	38,089	40,370	45,344	August	54,025	55,346	62,944
February	34,928	37,557	42,001	September	49,505	52,297	58,995
March	43,042	44,607	48,760	October	49,854	53,807	.....
April	44,264	47,683	55,154	November	47,407	49,074	.....
May	49,766	52,946	59,307	December	43,807	46,413	.....
June	50,133	55,459	58,360				
July	50,689	53,865	63,093	Total	555,509	589,424	.....

* Revised.

Rims Inspected and Passed in U. S.

(Tire and Rim Association Reports)

	Total		Total		Total
1929	24,141,502	1933	8,713,962	1937	22,257,798
1930	17,364,096	1934	12,255,118	1938	10,619,338
1931	11,253,800	1935	18,664,107	1939	17,471,914
1932	6,261,336	1936	20,789,504	1940	19,378,558
1941		1941		1941	
January ...	2,032,121	May	2,407,864	September .	1,811,267
February ..	2,131,211	June	2,308,986	October ...	2,023,781
March	2,665,961	July	2,061,144	November .	.....
April	2,682,225	August	1,532,032	December ..	....

Daily Spot Closing Prices of Ribbed Smoked Sheet Rubber—*New York Market, in Cents per Pound*

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Ave
1939																																
September	19	18			24	21	19	20	22		23	23	22	22	22	22		22	21	21	22		21		20	20	20	20	19			21
October	20		19	19	19	19			19	19	19		19	19			20		20	20	20	20	20	20	20	20			19	20	20	19
November	20	20	20	20		20		20		20	20		20	20	20	20	20	20	20	20	20	20										20
December	20	20		19	19	19	19	19	19		20	20	20	20	20	20		20	20	20	20					20	19	19	19	20		20
1940																																
January		19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	18	18	18	18	18	18	18	19
February		18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18
March		18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18
April		18	18	18	18	18	18	18	19	18	18	18	18	18	19	19	19	19	19	20	20	20	19	19	19	19	19	19	19	19	19	19
May		19	20	20	21	21	21	20	20	21	24	23	23	24	23	23	22	22	22	21	21	21	20	20	20	20	20	21	21	21	21	21
June		19	21	21	21	21	21	21	21	21	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	22
July		21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21
August		19	20	20	20	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
September		19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
October		19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
November		20	20	20	20	20	20	20	21	21	21	21	21	21	21	21	21	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
December		20	20	20	20	20	21	21	21	21	21	21	21	21	21	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
1941																																
January		20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	19	20
February		19	19	19	19	19	19	19	19	20	20	22	22	22	22	22	22	22	21	21	21	21	21	21	21	21	21	21	21	21	21	21
March		20	20	22	21	21	21	22	22	21	21	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23
April		22	22	23	23	23	22	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24
May		24	23	23	23	23	24	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22
June		23	23	23	23	23	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24
July		21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21
August		21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21
September		23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23
October		22	22	22	22	22	22	22	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23
November		22	22	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23
December		23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23

Average Spot Closing Prices—Ribbed Smoked Sheets

(New York Markets)

Average Price per Pound for Years 1913-1932

Year	Cents	Year	Cents	Year	Cents	Year	Cents	Year	Cents
1914	65.33	1918	60.15	1922	17.50	1926	48.50	1930	11.98
1915	65.85	1919	48.70	1923	29.45	1927	37.72	1931	6.17
1916	72.50	1920	36.30	1924	26.20	1928	22.48	1932	3.49
1917	72.23	1921	16.36	1925	72.46	1929	20.59	1933	5.96

Average Monthly Price per Pound Since 1933

	1934 Cents	1935 Cents	1936 Cents	1937 Cents	1938 Cents	1939 Cents	1940 Cents	1941 Cents
Jan.	9.32	13.10	14.35	21.37	14.63	15.75	19.06	19.88
Feb.	10.45	12.92	15.48	21.33	14.71	15.93	18.83	20.43
Mar.	11.01	11.51	15.89	24.09	13.55	16.26	18.58	22.17
Apr.	12.10	11.55	15.98	23.44	11.84	15.87	19.16	22.74
May	13.26	12.05	15.63	21.14	11.57	16.07	21.21	23.90
June	13.51	12.57	15.85	19.29	12.57	16.37	22.20	21.88
July	14.60	12.10	16.49	18.86	15.37	16.51	21.12	22.19
Aug.	15.47	11.98	16.25	18.37	16.08	16.67	19.62	22.70
Sept.	15.36	11.55	16.46	18.55	16.15	21.24	19.28	22.57
Oct.	13.96	12.62	16.55	16.28	16.89	19.89	20.33	23.10
Nov.	13.04	13.15	17.97	14.60	16.24	20.21	21.04	23.14
Dec.	12.98	13.28	20.01	15.41	16.05	20.01	20.76	
Average for Year	12.92	12.37	16.41	19.39	14.64	17.57	20.10	

London Closing Prices of Ribbed Smoked Sheets

(In Pence Per Pound)

Day	1941 May	1941 June	1941 July	1941 Aug.	Day	1941 May	1941 June	1941 July	1941 Aug.
1	14	——	——	——	16	14 7/16	——	——	
2	14	——	——	——	17	——	——	——	
3	——	13 7/16	——	——	18	——	——	——	
4	——	13 1/2	——	——	19	14	——	——	
5	——	13 9/16	——	——	20	13 15/16	——	——	
6	——	13 9/16	——	——	21	13 7/8	——	——	
7	——	——	——	——	22	13 7/8	——	——	
8	——	——	——	——	23	13 1/2	——	——	
9	——	——	——	——	24	——	——	——	
10	——	——	——	——	25	——	——	——	
11	——	——	——	——	26	13 9/16	——	——	
12	——	——	——	——	27	13 9/16	——	——	
13	——	——	——	——	28	13 7/8	——	——	
14	——	——	——	——	29	13 7/16	——	——	
15	14	——	——	——	30	13 9/16	——	——	
					31	——	——	——	

Note: No quotations have been made on the London Exchange since June 6.

Average Monthly Price Per Pound

Month	1938 Pence	1939 Pence	1940 Pence	1941 Pence	Month	1938 Pence	1939 Pence	1940 Pence	1941 Pence
Jan.	7.077	7.926	11.793	12.415	Aug.	7.841	8.545	12.818	
Feb.	7.029	7.942	12.577	12.769	Sept.	7.918	9.634	11.964	
Mar.	6.590	8.120	11.651	13.967	Oct.	8.355	10.177	11.813	
Apr.	5.793	7.910	10.980	14.228	Nov.	8.111	11.210	11.801	
May	5.632	8.002	11.600	13.670	Dec.	8.005	11.559	11.963	
June	6.147	8.216	13.046	——	Average for Year.	7.164	8.959	12.035	
July	7.464	8.271	12.410	——					

Spot Closing Cotton Prices

(Middling Upland Grade—New York Market)

Recent Daily Price Per Pound

Date	1941 Oct.	1941 Nov.	1941 Dec.	Date	1941 Oct.	1941 Nov.	1941 Dec.	Date	1941 Oct.	1941 Nov.	1941 Dec.
1	17.91	16.98	17.52	11	17.50	——		22	17.04	17.16	
2	17.81	——	17.57	12	——	17.21		23	17.35	——	
3	17.74	16.99	17.87	13	——	17.24		24	17.21	17.09	
4	18.02	——	18.03	14	17.59	17.19		25	17.06	17.14	
5	——	17.02	18.24	15	17.29	17.29		26	——	17.39	
6	17.86	17.04	18.16	16	16.59	——		27	16.83	17.38	
7	17.75	17.20	——	17	16.95	17.16		28	16.93	17.36	
8	17.46	17.34	18.23	18	17.07	17.23		29	17.05	17.46	
9	17.37	——	17.85	19	——	17.25		30	17.14	——	
10	17.54	17.31		20	16.78	——		31	17.07	——	
				21	17.05	17.20					

Average Monthly Price Per Pound

	1938 Cents	1939 Cents	1940 Cents	1941 Cents		1938 Cents	1939 Cents	1940 Cents	1941 Cents
Jan.	8.57	8.94	11.19	10.66	Aug.	8.41	9.30	9.84	17.06
Feb.	8.91	8.97	11.10	10.87	Sept.	8.17	9.30	9.69	17.94
Mar.	8.92	9.00	10.90	11.08	Oct.	8.61	9.24	9.62	17.31
Apr.	8.76	8.87	10.89	11.48	Nov.	9.08	9.73	9.97	17.21
May	8.50	9.56	10.33	12.97	Dec.	8.72	10.97	10.18	
June	8.38	9.88	10.72	14.66	Average for Year	8.66	9.46	10.40	
July	8.85	9.71	10.42	16.55					

Stocks of Crude Rubber

(All figures are in long tons)

ON HAND OR AFLOAT TO THE U. S.

End of	ON HAND 1939	ON HAND 1940	ON HAND 1941	AFLOAT 1939	AFLOAT 1940	AFLOAT 1941	TOTAL 1939	TOTAL 1940	TOTAL 1941
Jan.	220,727	139,304	309,411	48,210	90,285	153,169	268,937	229,589	462,580
Feb.	207,882	129,023	320,372	55,814	112,257	136,955	263,696	241,280	457,327
Mar.	201,752	134,871	338,147	55,981	113,619	140,228	257,733	248,490	478,375
Apr.	188,074	152,645	329,767	57,918	102,557	153,484	245,992	255,202	483,251
May	187,980	148,881	359,234	54,046	109,364	147,459	242,026	258,245	506,693
June	173,493	154,313	339,108	51,274	119,138	175,499	224,767	273,451	514,607
July	165,450	175,455	395,216	52,990	139,629	132,304	218,440	315,084	527,520
Aug.	152,029	194,760	446,008	66,717	141,286	90,591	218,746	336,046	536,599
Sept.	136,824	220,597	473,684	68,310	137,888	141,756	205,134	358,485	615,440
Oct.	119,404	235,353	454,711	100,500	166,837	172,633	219,904	402,190	627,344
Nov.	105,205	250,412		114,044	158,095		219,249	408,507	
Dec.	125,800	288,864		91,095	145,950		216,895	434,814	

Note: Above figures include stocks held by United States Government.

STOCKS OUTSIDE REGULATED AREAS

(Figures from the International Rubber Regulation Committee)

1940	Singapore and Penang	Para and Manaos	United Kingdom	United States	Total
August	40,395	1,580	25,000*	212,774	279,749
September	29,069	2,559	25,000*	241,538	298,166
October	33,613	3,084	30,000*	259,140	325,837
November	33,778	3,697	30,000*	276,943	344,418
December	26,773	2,165	35,000*	318,486	382,424
1941					
January	37,145	2,151	40,000*	309,411	388,707
February	46,913	2,510	40,000*	320,372	409,795
March	41,005	1,200	40,000*	338,147	420,352
April	42,085	2,205	40,000*	329,767	414,057
May	44,610	1,768	40,000*	364,107	450,485
June	43,263	915	40,000*	339,108	423,286
July	41,534	1,063	40,000*	395,216	477,813

* Estimated.

STOCKS INSIDE REGULATED AREAS

(Figures from the International Rubber Regulation Committee)

1940	Malaya	N.E.I.[1]	Ceylon [1]	Other *	Total
August	39,950	38,251	9,771	4,256	92,228
September	44,730	39,614	9,384	4,124	97,852
October	42,239	37,720	9,158	4,407	93,524
November	43,693	39,267	11,675	3,997	98,632
December	48,787	48,622	11,850	4,124	113,383
1941					
January	47,198	45,137	13,196	4,329	109,860
February	55,512	48,390	14,677	4,064	122,743
March	44,432	46,492	13,841	4,210	108,975
April	53,237	46,755	14,432	4,009	118,433
May	46,511	49,184	.....	3,772	.....
June	46,758	51,319	.....	4,432	.....
July	49,666	.....	.....	4,113	.....

[1] Estates and Dealers. (*) Estimated.

RUBBER STOCKS AFLOAT

	Afloat for United States	Afloat for Europe	All Other Afloat	Total Afloat
End of: 1940				
August	141,286	55,000	53,714	255,000
September	137,033	60,000	67,967	265,000
October	166,837	60,000	38,163	265,000
November	158,095	60,000	31,905	250,000
December	145,950	60,000	44,050	250,000
End of: 1941				
January	153,169	60,000	51,831	265,000
February	136,955	60,000	48,045	245,000
March	140,228	60,000	59,772	260,000
April	153,484	60,000	61,516	275,000
May	147,459	60,000	47,541	255,000
June	175,499	60,000	39,501	275,000
July	132,304	60,000	47,696	240,000
August	90,591	60,000	.....	.....

Note: *Total Afloat* figures are estimated at 1½ months' world shipments by the International Rubber Regulation Committee. *Afloat for U. S.* is supplied by the Rubber Manufacturers Association. *Afloat for Europe* is estimated. *All Other Afloat* is determined by subtraction.

TOTAL WORLD STOCKS

At End of:	1936	1937	1938	1939	1940	1941
January	600,479	454,249	549,762	497,665	433,841	753,021
February	599,355	445,265	565,833	479,578	429,551	769,193
March	583,318	447,856	586,666	460,723	447,472	783,737
April	567,172	428,249	586,291	438,252	465,345	765,521
May	541,871	413,134	568,158	429,979	470,981	777,429
June	520,255	434,250	573,136	407,640	500,774	771,229
July	519,074	445,782	580,654	418,639	547,708	799,934
August	500,520	457,462	565,394	397,345	579,119	859,329
September	493,585	470,768	551,447	396,867	631,888	.....
October	486,159	479,398	540,976	413,274	651,775	.....
November	466,491	493,266	512,196	395,217	659,308	.....
December	466,576	545,533	482,852	391,125	702,089	.....
Monthly Avge.	528,738	460,022	555,280	427,192	543,321	.....

Note: Figures prior to 1941 represent principal world stocks only, as supplied by the Department of Commerce. Figures since 1941 represent total world stocks, as compiled by the Commodity Exchange, Inc.

U. S. Tire and Tube Statistics

(All Figures Represent Thousands)

AUTOMOBILE CASINGS

Production Figures on Quarterly Basis

Quarter	1934	1935	1936	1937	1938	1939	1940	1941
Jan.-Mar.	13,437	13,355	11,376	15,565	7,314	13,946	14,896	16,333
Apr.-June	13,565	12,597	14,892	15,834	7,380	13,759	15,636	18,310
July-Sept.	9,822	11,312	14,914	12,207	10,794	15,182	13,877	15,191
Oct.-Dec.	10,406	12,099	14,858	9,704	12,360	14,726	14,777	
Total	47,230	49,363	56,040	53,310	37,848	57,613	59,186	

Shipment Figures on Quarterly Basis

Quarter	1934	1935	1936	1937	1938	1939	1940	1941
Jan.-Mar.	10,730	11,154	10,554	14,143	7,388	12,445	12,791	15,263
Apr.-June	14,998	13,473	15,940	15,741	9,564	15,107	17,595	21,277
July-Sept.	11,648	13,489	14,037	13,106	11,243	15,791	12,904	17,120
Oct.-Dec.	9,310	12,066	12,855	10,495	12,098	14,165	15,484	
Total	46,686	50,182	53,386	53,485	40,293	57,508	58,774	

Inventory Figures [2]

Quarter	1934	1935	1936	1937	1938	1939	1940	1941
Jan.-Mar.	11,651	11,675	8,762	12,004	10,547	9,963	10,789	10,149
Apr.-June	10,219	10,755	7,556	12,081	8,337	8,632	8,871	7,088
July-Sept.	8,419	8,288	8,690	11,200	7,859	8,080	9,837	5,170
Oct.-Dec.	9,455	8,196	10,717	10,383	8,166	8,665	9,127	

Figures for Recent Months

	PRODUCTION 1939	PRODUCTION 1940	PRODUCTION 1941	SHIPMENTS 1939	SHIPMENTS 1940	SHIPMENTS 1941	INVENTORY [2] 1939	INVENTORY [2] 1940	INVENTORY [2] 1941
Oct.	5,392	5,077	4,834	5,161	5,525	5,867	8,382	9,410	4,123
Nov.	4,865	4,732		4,278	4,969		8,918	9,163	
Dec.	4,469	4,991		4,727	4,991		8,665	9,127	

AUTOMOBILE INNER TUBES

Production Figures on Quarterly Basis

Quarter	1934	1935	1936	1937	1938	1939	1940	1941
Jan.-Mar.	12,823	12,553	11,891	15,831	7,314	12,383	12,801	15,349
Apr.-June	13,191	11,631	14,624	15,413	7,380	11,847	13,703	17,584
July-Sept.	10,321	11,270	15,320	12,038	10,794	13,118	12,425	13,884
Oct.-Dec.	9,891	12,425	15,201	9,092	12,360	13,300	13,308	
Total	46,226	47,879	57,036	52,374	37,848	50,648	52,237	

Shipment Figures on Quarterly Basis

Quarter	1934	1935	1936	1937	1938	1939	1940	1941
Jan.-Mar.	10,640	11,252	11,367	14,606	7,387	11,422	11,683	14,265
Apr.-June	14,553	11,928	15,113	15,495	9,564	13,010	14,978	18,577
July-Sept.	11,545	13,251	15,069	12,901	11,243	13,449	11,344	15,499
Oct.-Dec.	8,306	11,636	12,874	9,765	12,099	13,309	14,209	
Total	45,044	48,067	54,423	52,767	40,293	51,190	52,214	

Inventory Figures [2]

Quarter	1934	1935	1936	1937	1938	1939	1940	1941
Jan.-Mar.	10,244	10,406	8,660	11,993	10,547	8,752	8,110	8,069
Apr.-June	8,795	10,050	8,075	11,833	8,337	7,549	6,848	7,010
July-Sept.	7,639	7,565	8,595	11,326	7,859	7,206	7,970	5,467
Oct.-Dec.	9,180	8,231	10,945	10,312	8,166	7,036	7,017	

Figures for Recent Months

	PRODUCTION 1939	PRODUCTION 1940	PRODUCTION 1941	SHIPMENTS 1939	SHIPMENTS 1940	SHIPMENTS 1941	INVENTORY [2] 1939	INVENTORY [2] 1940	INVENTORY [2] 1941
Oct.	5,008	4,548	4,137	4,948	4,876	5,143	7,279	7,648	4,448
Nov.	4,508	4,104		3,967	4,690		7,710	7,056	
Dec.	3,784	4,656		4,394	4,644		7,036	7,017	

[1] These figures are based on reports received from the Rubber Manufacturers Association. They are revised frequently and the latest available issue should be consulted for most reliable figures.

[2] Stocks held by manufacturers at end of period indicated.

Automobile Production

Year	United States Total	United States Passenger Cars	United States Trucks	Canada Total	Canada Passenger Cars	Canada Trucks	Grand Total
1929	5,358,420	4,587,400	771,020	263,295	207,498	55,797	5,621,715
1930	3,355,986	2,814,452	540,534	154,192	125,442	28,750	3,510,178
1931	2,389,730	1,973,090	416,640	82,621	63,477	19,144	2,472,351
1932	1,370,678	1,135,493	235,187	60,816	50,718	10,098	1,431,494
1933	1,920,057	1,573,512	346,545	65,924	53,855	12,069	1,992,126
1934	2,753,111	2,177,919	575,192	116,852	92,647	24,205	2,869,963
1935	3,946,934	3,252,244	694,690	172,877	135,562	37,315	4,119,811
1936	4,454,115	3,669,528	784,587	162,159	128,369	33,790	4,616,274
1937	4,808,974	3,915,889	893,085	207,463	153,046	54,417	5,016,437
1938	2,489,085	2,000,985	488,100	166,086	123,761	42,325	2,655,171
1939*	3,577,292	2,866,796	710,496	155,426	108,369	47,057	3,732,718
1940	4,469,354	3,692,328	777,026	222,984	110,126	112,858	4,692,338
1941							
Apr.*	462,270	374,979	87,291	27,584	12,091	15,493	489,854
May	518,748	417,698	101,050	26,585	9,840	16,745	545,333
June	520,521	418,983	101,538	25,753	8,538	17,215	546,274
July *	444,241	343,748	100,493	24,654	3,849	20,805	468,895
Aug.	147,600	78,529	69,071	17,192	3,160	14,032	164,792
Sept.	234,255	167,790	66,465	14,496	2,548	11,948	248,751
Oct.	382,000	295,568	86,432	19,360	5,635	13,725	401,360
Nov.	.....	.....	.....	.....	.....	.....	.....
Dec.	.....	.....	.....	.....	.....	.....	.....

* Revised.

Note: U. S. figures represent factory sales; Canadian, production.

Exports of Crude Rubber from Principal Producing Countries

(Long Tons)

	BRITISH MALAYA							NETHERLAND INDIES							
	Gross Exports	Imports	Net Exports	Ceylon	India & Burma	Sarawak	British North Borneo	Thailand	Java & Madura	Sumatra E. Coast	Other N.I.	Indo-China	Amazon Valley	All Other	World Total
1923	252,016	70,432	181,584	39,971	6,416	5,705	4,237	1,718	32,930	46,344	57,822	5,067	16,765	7,856	406,415
1924	259,706	108,524	151,182	39,997	7,697	6,699	4,621	2,962	42,446	54,497	80,347	6,688	23,165	9,065	429,366
1925	316,825	158,022	158,803	49,566	10,082	5,424	5,377	5,377	46,757	65,499	120,626	7,881	25,298	13,797	514,487
1926	391,328	151,243	240,085	58,962	9,874	9,155	6,079	4,027	52,186	71,413	121,231	8,203	24,298	16,017	621,536
1927	371,322	182,845	188,477	55,356	11,321	10,923	6,582	5,472	55,297	77,815	142,171	8,645	28,782	15,633	606,474
1928	409,430	149,787	259,643	57,267	10,790	10,087	6,698	4,813	58,848	82,511	121,770	9,548	21,129	10,690	653,794
1929	574,836	163,092	411,744	81,584	11,663	11,077	7,381	5,018	65,990	87,789	134,037	9,696	21,148	6,767	853,894
1930	547,043	133,876	413,167	76,970	10,782	10,309	6,781	4,251	69,755	79,396	115,234	7,665	14,260	5,651	814,241
1931	319,740	125,506	394,234	61,769	8,470	10,451	6,247	4,218	75,952	87,747	116,009	11,696	12,121	3,292	792,203
1932	478,252	92,539	385,713	48,973	3,888	6,960	4,664	3,451	61,312	79,837	85,871	13,883	6,450	1,816	702,818
1933	573,412	167,377	406,035	63,351	4,527	10,874	7,555	7,765	73,851	91,861	149,659	18,394	9,883	2,737	846,312
1934	677,361	211,803	465,558	79,746	10,492	17,233	11,103	17,545	87,400	112,058	175,470	20,170	8,903	2,985	1,008,663
1935	590,319	174,652	415,667	54,316	13,968	19,465	8,883	28,327	57,488	78,325	139,297	28,816	11,275	8,745	864,574
1936	520,286	167,799	352,487	49 692	14,724	21,243	8,177	33,702	61,307	84,577	152,205	40,782	14,193	11,466	845,431
1937	681,638	213,446	468,192	70,353	17,015	25,922	13,213	5,551	84,085	139,632	207,863	43,399	15,576	13,063	1,133,864
1938	526,911	156,101	370,810	49,528	15,178	17,792	9,512	41,080	57,526	94,501	145,909	58,518	14,618	12,920	887,892
1939	553,324	177,851	375,473	61,026	15,881	24,014	11,864	41,266	72,786	117,791	181,272	65,140	13,892	22,224	1,002,629

	British Malaya [1]	N.E.I.	Ceylon [2]	India & Burma [2]	North Borneo	Sarawak	Thailand	Indo-China	Oceania	Africa [2]	Liberia	South America	Mexico (Guayule)	Grand Total
1940	540,417	536,740	88,894	23,317	17,623	35,166	43,940	64,437	2,267	10,103	7,223	17,601	4,106	1,391,834
1940:														
Aug.	45,872	45,078	8,139	1,332	1,593	2,640	4,545	7,337	285	800	308	1,233	327	120,729
Sept.	58,892	44,009	9,985	1,319	1,743	2,404	3,247	9,303	100	800	323	1,295	200	133,715
Oct.	52,767	50,139	8,127	1,841	1,693	2,564	3,355	2,082	200	800	600	1,860	200	126,228
Nov.	36,045	37,387	5,623	2,626	1,130	3,360	3,463	6,715	200	800	600	1,500	200	99,649
Dec.	56,263	35,325	10,700	3,405	1,028	3,520	5,343	9,000	200	600	813	1,427	392	128,216
1941:														
Jan.	37,804	58,593	7,859	1,486	2,085	2,445	2,137	9,058	333	667	750	2,103	288	125,608
Feb.	27,115	42,091	4,332	1,421	1,686	2,922	4,137	1,995	96	854	828	1,814	414	89,705
Mar.	56,651	53,233	6,073	1,770	1,154	3,726	5,712	6,286	117	636	958	2,835	355	139,506
Apr.	40,590	48,915	6,985	1,661	2,175	3,118	4,271	....	263	864	750	2,009	423	112,024
May	53,062	48,099	7,638	1,831	1,237	3,849	1,841	6,225	156	800	180	1,080	334	126,332
June	51,247	48,496	8,925	1,056	986	3,195	2,831	7,318	200	800	919	1,510	250	127,733
July	53,373	53,429	7,387	939	1,803	3,799	3,614	3,445	200	800	750	1,253	250	131,042
Aug.	46,404	51,890	9,081	725	1,812	3,086	4,852	6,496	200	800	750	1,288	250	127,634
Sept.	70,598	65,496	6,706	145	1,371	2,495	6,524	8,000	200	800	750	1,421	250	164,756

(1) Including Brunei and Labuan; figures shown represent rubber which has actually been shipped and include rubber from the free stocks in Singapore and Penang. (2) Exports of domestic produce. (3) Exclusive of Liberia. Notes: Figures shown prior to 1940 were furnished by the United States Department of Commerce. Figures since 1940 were furnished by the International Rubber Regulation Committee, which accounts for the difference in the principal producing countries shown. Many figures for current months are provisional only and are later revised when more definite statistics are available. Therefore, it is suggested that figures from the most recent issue should be taken as more reliable.

Net Imports of Crude Rubber into Principal Manufacturing Countries

(Long Tons)

	United States [1]	United Kingdom	France (h)	Germany	Canada (ac)	Japan (da)	Italy	Russia (ce)	Australia (cd)	Belgium (d)	Netherlands	Scandinavia (abcdf)	Spain (g)	Czechoslovakia (abcd)	Total
1919	238,407	42,671	17,683	5,584	6,395	9,753	9,894	75	1,002	3,995	2,771	3,149	2,418	9	343,808
1920	249,530	56,844	13,882	11,890	11,746	5,297	6,123	62	1,815	3,840	5,510	2,292	2,008	567	371,409
1921	179,736	42,087	15,135	21,920	8,124	21,713	3,906	165	1,014	1,705	1,022	1,279	2,245	569	300,620
1922	296,594	11,724	24,352	27,546	9,207	15,934	6,430	2,493	2,643	172	—3,807	1,778	589	567	396,222
1923	301,527	12,700	27,392	18,519	13,277	15,372	8,489	2,986	1,649	2,184	792	2,528	630	1,128	409,173
1924	319,103	—11,550	30,446	22,727	14,299	19,571	8,764	2,346	3,124	2,688	—807	3,178	944	1,370	416,203
1925	385,596	4,061	32,956	33,937	19,683	11,117	11,412	7,088	4,757	2,930	875	3,149	1,155	1,558	520,274
1926	399,981	84,865	34,240	22,775	20,229	18,125	9,809	6,529	9,021	2,498	2,670	4,046	1,290	1,870	617,957
1927	403,472	60,249	34,271	38,892	26,405	20,521	11,381	12,018	9,490	6,482	636	4,224	2,055	2,672	632,768
1928	407,572	4,846	36,498	37,855	30,447	25,621	12,433	15,134	8,430	7,958	2,243	4,418	3,178	3,138	599,771
1929	528,608	122,675	55,093	49,275	35,453	34,284	17,169	11,774	15,386	9,643	3,022	6,440	864	4,650	894,638
1930	458,036	120,069	68,503	45,488	28,793	33,039	18,639	16,387	5,354	10,635	2,924	7,710	2,400	4,468	822,445
1931	475,993	86,170	46,466	39,688	25,261	43,483	10,149	30,671	7,649	11,009	2,220	6,360	2,605	7,717	794,641
1932	393,844	44,086	42,506	45,121	20,917	56,027	14,469	30,637	12,576	9,519	2,851	7,262	4,359	9,444	693,618
1933	398,365	73,335	61,953	54,120	19,332	66,831	19,341	29,830	13,534	11,166	1,243	7,831	5,520	10,402	772,803
1934	439,172	158,482	49,560	59,330	28,439	69,905	21,398	47,271	9,642	9,115	3,758	12,418	6,900	10,999	926,389
1935	455,758	128,829	51,450	62,899	26,870	57,567	21,880	37,572	9,978	7,593	4,068	11,878	8,140	11,245	895,727
1936	475,359	—2,591	57,032	71,794	27,871	61,223	16,534	30,967	14,109	9,648	2,888	11,236	6,668	8,772	791,510
1937	592,394	92,707	59,871	98,170	36,088	62,311	24,733	30,462	19,164	14,970	4,343	4,680	2,400	13,063	1,055,356
1938	406,343	133,079	59,660	90,200	25,696	45,836	28,170	25,650	11,944	11,309	5,092	16,034	2,400	9,936	871,349
1939	486,348				31,615	42,352			15,426	9,612	7,051				
1940	811,564														
1940:															
Feb.	41,797	7,500	5,000*	....	3,508	5,241	1,500*	2,000*	1,846	694	495	1,200*	200*	....	....
Mar.	58,302	14,200	5,000*	....	3,062	6,057	1,500*	2,000*	1,784	....	627	1,200*	200*	....	....
Apr.	70,135	16,400	5,000*	....	3,096	2,000*	1,500*	2,000*	1,612	....	....	1,200*	200*	....	....
May	50,610	10,000	5,000*	....	3,108	2,500*	1,500*	2,000*	2,128	....	....	1,200*	200*	....	....
June	53,266	9,500	5,000*	....	1,062	3,000*	1,500*	2,000*	1,181	....	....	1,200*	200*	....	....
July	69,496	19,500	5,000*	....	5,112	3,000*	1,500*	2,000*	1,902	....	....	1,200*	200*	....	....
Aug.	72,612	21,250	5,000*	....	4,605	4,500*	1,500*	2,000*	2,508	....	....	1,200*	200*	....	....
Sept.	78,306	25,940	5,000*	....	2,743	....	1,500*	2,000*	2,485	....	....	1,200*	200*	....	....
Oct.	74,400	.....	5,000*	....	8,336	....	1,500*	2,000*	590	....	....	1,200*	200*	....	....
Nov.	72,775	.....	5,000*	....	5,451	....	1,500*	2,000*	1,366	....	....	1,200*	200*	....	....
Dec.	97,794	.....	5,000*	....	7,437	....	1,500*	2,000*	721	....	....	1,200*	200*	....	....
1941:															
Jan.	86,541	.....	5,000*	....	6,290	....	1,500*	2,000*	1,065	....	....	1,200*	200*	....	....
Feb.	73,647	.....	5,000*	....	3,770	....	1,500*	2,000*	1,717	....	....	1,200*	200*	....	....
Mar.	86,794	.....	5,000*	....	3,879	....	1,500*	2,000*	3,486	....	....	1,200*	200*	....	....
Apr.	63,071	.....	5,000*	....	2,531	....	1,500*	2,000*	2,326	....	....	1,200*	200*	....	....
May	101,034	.....	5,000*	....	5,596	....	1,500*	2,000*	1,549	....	....	1,200*	200*	....	....
June	64,101	.....	5,000*	....	2,818	....	1,500*	2,000*	1,373	....	....	1,200*	200*	....	....
July	96,681	.....	5,000*	....	4,143	....	1,500*	2,000*	....	....	....	1,200*	200*	....	....
Aug.	106,139	.....	5,000*	....	....	....	1,500*	2,000*	....	....	....	1,200*	200*	....	....
Sept.	81,343	.....	....	....	....	....	....	.....	....	....	....	....	....	....	....

a—Including gutta percha. b—Including balata. c—Re-exports not deducted in monthly statistics. d—Including some scrap and reclaimed rubber. e—Official statistics of rubber imports by Soviet Russia. f—Including Norway, Sweden, Denmark and Finland. g—United Kingdom and French exports to Spain except in years prior to 1925. h—French imports have been reduced in order to eliminate imports of gutta percha and to reduce to basis of net weight. [1]—United States imports of guayule are included in this compilation. *—Figure is provisional; final figure will be shown when available.

NOTE: ANNUAL FIGURES ARE MORE ACCURATE; THEY ARE REVISED AT THE END OF THE FOLLOWING YEAR.

The WHERE-TO-BUY Section of THE RUBBER AGE in which are listed the Products and Services of the Leading Suppliers to the Industry.

The Market Place

If what you are seeking is not listed here, write to the Service Department of THE RUBBER AGE, 250 West 57th St., New York, N. Y.

Chemicals and Compounding Materials

ACCELERATORS—
El-Sixty; Ureka; Ureka C; Guantal; Santocure; RN-2 Crystals; DPG; Pip Pip; A-32; A-100; R-2 Crystals; A-10 • ANTIOXIDANTS — Flectols B, H, White; Santoflex B; Santovar A.
MONSANTO CHEMICAL CO.
Rubber Service Dept.
1012 Second National Bldg., Akron, Ohio

AERO BRAND
RUBBER CHEMICALS
DPG—DOTG—Accelerator 49
Rubber Sulphur
American Cyanamid & Chemical Corporation
30 Rockefeller Plaza, New York, N. Y.

ALUMINUM FLAKE
A uniform, fine, low gravity, white reinforcing pigment. *Furnished to the rubber trade for 39 years.*
The Aluminum Flake Co.
Akron, Ohio

ANTIMONY Pentasulphide, golden and crimson, very fine, pure.
Rare Metal Products Co.
Belleville, N. J.
Direct Factory Representation

ASBESTINE—Specially prepared for use in Rubber. Send for liberal working samples.
SOLE PRODUCERS
International Pulp Co.
41 Park Row New York City

CALCENE—The Ideal low gravity, white reinforcing pigment. Gives high tensile and elongation properties with exceptionally good resistance to tear and abrasion.
PITTSBURGH PLATE GLASS CO., COLUMBIA CHEMICAL DIV.
30 Rockefeller Plaza, New York, N. Y.

CAMELINE WHITE CALCITE **FILLER**
99.75% 325 mesh, more than 90% minus 25 microns; soft, thin, platy particles, assuring better tensile, flexing and elongation.
HARRY G. HOEHLER
YORK, PA.

CARBON BLACK— *Micronex*
the world's standard gas black, universally known as the "King of Rubber Pigments."
Binney & Smith Co.
41 East 42nd St. New York City

CARBON BLACK
CONTINENTAL
The Newest Name in Carbon Black offers
CONTINENTAL DUSTLESS
CONTINENTAL COMPRESSED
CONTINENTAL UNCOMPRESSED
Continental Carbon Company
295 Madison Ave., New York, N.Y.

CARBON BLACK— *Aerfloted*
Arrow Black for rubber compounding. Standard for grit-free uniformity.
J. M. Huber, Inc.
460 West 34th St. New York

CARBON BLACK
DIXIE...KOSMOS
Used throughout the world
UNITED CARBON COMPANY
Charleston, W. Va.
New York • Akron • Chicago

CARBON BLACK
WITCO DISPERSO
and DUSTLESS and a
Complete Line of High Quality
Rubber Chemicals
Wishnick-Tumpeer, Inc.
295 Madison Ave., New York, N.Y.

CATALPO—The universal and standard rubber pigment now being used in treads, solids, tubes, carcass frictions, etc.
Moore & Munger
33 Rector Street New York City

CHEMICALS

For Rubber		For Industry Generally	
Accelerators	*Acids*		*Latex*
Antioxidants	*Oil of Myrbane*		*Lotol*
Specialties	*Aniline Oil*		*Dispersions*

NAUGATUCK CHEMICAL
Division of United States Rubber Co.
1230 SIXTH AVE. NEW YORK

CHEMICALS AND MINERAL
Ingredients—Whiting, Clay, Talc, Barytes, Colors. Heavy Calcined Magnesia. Carbonate of Magnesia, Pumice Stone.
Standard Since 1890
Whittaker, Clark & Daniels, Inc.
260 West Broadway New York

COAL TAR CHEMICALS

Coumarone Resins	Tack Producers
Resinous Oils	Dispersing Oils
Reclaiming Oils	Softeners
	Solvents

The Neville Company
Neville Island, Pittsburgh, Penna.

COLLOIDAL SULPHUR
COLLOIDAL ZINC OXIDE
COLLOIDAL COLORS
HEVEATEX CORPORATION
78 Goodyear Ave. Melrose, Mass.
Offices in New York, Akron, Chicago

COLORS
Harmon Organic Rubber Color Granules are bright in shade and fast in cure. *Easy to weigh—Easy to disperse—Economical—Will not dust or fly.*
Harmon Color Works, Inc.
Paterson, N. J.

COLORS
BRILLIANT ORGANIC DYES; PERMANENT, NON-BLEEDING, LOW COST
For All Cures
MONSANTO CHEMICAL CO.
Rubber Service Dept.
1012 Second National Bldg., Akron, Ohio

CHEMICALS
Carbon Black—Clay—Colors
Accelerators—Sulphur
Stocks Carried At All Times
Ernest Jacoby & Co.
79 Milk St. Boston, Mass.
Cable Address: Jacobite Boston

COMPOUNDING Materials

Vulcanizing Agents	Pigments
Accelerators	Clays
Antioxidants	Mineral Rubber
Plasticizers	Aromatics
Dispersions	Blacks

R. T. VANDERBILT CO.
230 Park Ave. New York City

The Market Place

The WHERE-TO-BUY Section of THE RUBBER AGE in which are listed the Products and Services of the Leading Suppliers to the Rubber Industry. If what you are seeking is not listed here, write to the Service Department of THE RUBBER AGE, 250 West 57th St., New York, N. Y.

Chemicals and Compounding Materials (continued)

CROWN CLAY
An Approved Clay for Rubber Compounding
Southeastern Clay Co.
Aiken South Carolina

MAGNESIUM SALTS
"MARINCO" Magnesium Carbonates, Hydroxides, Oxides
U.S.P. Technical and Special Grades
Marine Magnesium Products Corporation
South San Francisco, California

STEARIC ACID
STEAREX . . . CAKE or POWDER
STEAREX BEAD
Standardized Products for Rubber Compounding
MINERAL RUBBER (Parmr), TALC
SOAPSTONE
Binney & Smith Co.
41 East 42nd St. New York City

CUMAR —Paracoumarone Resin.
A neutral gum for rubber compounding.
Samples and prices on request.
The Barrett Div.
Allied Chemical & Dye Corp.
40 Rector St. New York City

MAPICO COLORS
Pure Oxides of Iron
Yellows—Reds—Browns—Black
MAGNETIC PIGMENT CO.
Manufacturers
BINNEY & SMITH CO.
Distributors
41 East 42nd Street, New York, N. Y.

SULPHURS
Rubbermakers' TIRE BRAND and TUBE BRAND. Also CRYSTEX Insoluble Sulphur, Sulphur Chloride, Caustic Soda, Carbon Bi-Sulphide, Carbon Tetra-Chloride.
Stauffer Chemical Company
2710 Graybar Bldg., New York City

DU PONT Rubber Chemicals
DU PONT RUBBER COLORS
DU PONT ACCELERATORS
DU PONT ANTI-OXIDANTS
E. I. du Pont de Nemours & Co., Inc.
RUBBER CHEMICALS DIVISION
WILMINGTON, DELAWARE

PARA-DORS—
overcome odors in rubber—effectively and at low cost.
GIVAUDAN-DELAWANNA, INC.
Industrial Aromatics Division
330 West 42nd St., New York, N. Y.

TITANIUM PIGMENTS
TITANOX-A (Titanium Dioxide)
TITANOX-B (Titanium Barium Pigment)
TITANOX-C (Titanium Calcium Pigment)
TITANOX-L (Lead Titanate)
TITANIUM PIGMENT CORP.
SELLING AGENTS
111 Broadway, New York, N. Y.
104 S. Michigan Ave., Chicago, Ill.

FACTICE—Prevents blooming, makes colors fast and a smoother batch.
Stamford Rubber Supply Co.
Stamford, Conn.

PARA-FLUX
The Universal Softener—Adaptable, Uniform. Improves Quality—Economical.
The C. P. Hall Co.
2510 First Central Tower
Akron Ohio

ZINC OXIDES
AZO ZZZ Zinc Oxides
lead free—pure—uniform—dependable
AZO ZZZ-11 AZO ZZZ-55
AZO ZZZ-22 AZO ZZZ-44 AZO ZZZ-66
American Zinc Sales Company
Columbus, Ohio *New York*
Chicago *St. Louis*

FURNEX—FURNEX BEADS
—A cool mixing reinforcing black for Footwear and Mechanicals. Good ageing —Improved oil resistance.
Binney & Smith Co.
41 East 42nd St. New York City

PELLETEX (The pellet *Gastex*)
The special process reinforcing black in free-flowing form. Saves power; none wasted; protects adjacent colored stocks.
GENERAL ATLAS CARBON DIV.,
GENERAL PROPERTIES CO., INC.
60 Wall St. New York

ZINC OXIDE PIGMENTS
The XX Reds Kadox
ZINC SULPHIDE PIGMENTS
The Cryptones The Albaliths (Lithopones)
The New Jersey Zinc Sales Co.
New York *Chicago*
Cleveland, Boston, San Francisco

GASTEX
Special Process Reinforcing BLACK. Superior aging and oil resistant properties. Low permanent set.
GENERAL ATLAS CARBON DIV.,
GENERAL PROPERTIES CO., INC.
60 Wall St. New York

RUBBER PROCESSING OILS
For outstanding compatibility in processing natural or modern synthetic rubbers, use
SUN RUBBER PROCESSING OILS
Write
SUN OIL COMPANY
Philadelphia Pennsylvania

ZINC OXIDES
Black Label Red Label Green Label
Manufactured by Our New Electrothermic Process
St. Joseph Lead Co.
250 Park Ave., New York
Plant and Laboratory: Monaca (Josephtown), Pa.

IRON OXIDES
Asbestine—Barytes—Talc—Soapstone
C. K. Williams & Co.
EASTON, PA.

RUBBER SUBSTITUTES
White, brown and black.
The Carter Bell Mfg. Co.
Springfield, New Jersey

ZINC STEARATE
ZINC LAURATE
Colite Mold Lubricant for Extra High Gloss
THE BEACON COMPANY
87 Bickford St., Boston, Mass.

The Market Place

The WHERE-TO-BUY Section of THE RUBBER AGE in which are listed the Products and Services of the Leading Suppliers to the Rubber Industry. If what you are seeking is not listed here, write to the Service Department of THE RUBBER AGE, 250 West 57th St., New York, N. Y.

Machinery and Equipment

CALENDER SHELLS
Gammeter's
ALL STEEL Calender Shells.
All welded. Any size.
New and better.
The W. F. GAMMETER CO.
Cadiz Ohio

CUTTING DIES
Cutting and perforating dies of all types for rubber manufacturers.
Send for our quotations
Brockton Cutting Die & Machine Co.
Avon, Mass.

CUTTING MACHINERY
Specialists in Rubber Cutting Equipment for Bands, Crude Stock, Jar Rings, Tubes, Rollers, Washers, Treads, Cement Stock, etc.
See Black Rock for All Cutting Problems
Black Rock Manufacturing Co.
179 Osborne St. Bridgeport, Conn.

DIAL GAUGES—Thickness
For measuring the thickness of rubber and similar materials. Many models.
Frank E. Randall
248 Ash St.,
Waltham Mass.

DRYING MACHINERY
For Synthetic Rubber, Reclaimed Rubber, Latex Processed Materials, etc.
PROCTOR & SCHWARTZ, INC.
Seventh St. & Tabor Rd. Philadelphia, Pa.

EXTRUDERS
The pioneer line of tubers, strainers and wire insulating machines. For latest developments inquire of
JOHN ROYLE & SONS
Paterson New Jersey

FORMS - PORCELAIN
Exclusive Manufacturers of Vitreous Porcelain Closed End Forms
No matter what shape or design—we can make it. Send blue print or sketch for our prices.
The Colonial Insulator Co.
936 Grant St. Akron, Ohio

GAUGES—
Diameter and thickness gauges in pocket and larger sizes for quick and accurate measurement of rubber.
B. C. AMES COMPANY
Waltham Mass.

GRINDING MILLS
SPAN grinding mill reduces soft and hard rubber to fine powder.
Made in U. S. A.
M. Pancorbo
155 John St. New York, N. Y.

HYDRAULIC PRESSES
for
RUBBER and PLASTICS
The McKinnon Iron Works Co.
Ashtabula Ohio

MACHINERY
L. ALBERT & SON
Trenton, N. J. Akron, O.
Los Angeles, Calif.

MACHINERY—RUBBER
"MASTER" Tube Molds, Tire Vulcanizers, Molds and Cores, Tire Drums, Tubers, etc.
Special Machinery Built to Order
Akron Standard Mold Co.
Akron, Ohio

MACHINERY
A complete service from the design of machinery to finished products of all kinds. Plant layouts — Formulas — Processes. Specializing in Latex Equipment.
Continental Machinery Company
305 BROADWAY, NEW YORK, N. Y.

MACHINERY
Cutting, Trimming, Skiving, Cementing, Eyeletting, Cutting Dies—Eyelets.
United Shoe Machinery Corp.
140 Federal St., Boston, Mass.

MAGNETIC EQUIPMENT of All Kinds
Separators Drums
Clutches Brakes
Rolls Special Magnets
Stearns Magnetic Mfg. Co.
640 So. 28th St., Milwaukee, Wis.

MANDRELS—All Types
Circular and Straight—Aluminum and Steel
Licensed Under Clyde E. Lowe Co. Patents
Sherardizing and Chrome Plating
Machinery—Air Bag & Mandrel Polishing
National Sherardizing & Machine Co.
Hartford, Conn. Akron, Ohio

MIXERS
ROSS Improved Mixers for cutting rubber cements. Standard Mixers, 50-500 gallons; Change Can Mixers, 5-50 gallons.
Send for Catalogue
Charles Ross & Son Company
158 Classon Ave., Brooklyn, N. Y.

MOLDS
For tires, rubber specialties and mechanical goods; general machine work.
The Akron Equipment Co.
Akron, Ohio

SHOE MACHINERY
Bed Lasters
Clickers or Cutting Machines
Skiving Machines
Lacing Machines (same as Ensign Type)
Hamlin Machine Company
67 Maplewood St. Malden, Mass.
N. W. MATHEY, Owner

SPECIAL MACHINERY
For Quality and Efficiency in Working Rubber. Consult us about your problems.
Utility Manufacturing Co.
Cudahy, Wisconsin

YOUR PRODUCTS
Should be displayed in
THE MARKET PLACE
Show What You Have to Sell

The Market Place

The WHERE-TO-BUY Section of THE RUBBER AGE in which are listed the Products and Services of the Leading Suppliers to the Rubber Industry. If what you are seeking is not listed here, write to the Service Department of THE RUBBER AGE, 250 West 57th St., New York, N. Y.

Machinery [Cont'd]

STOCK SHELLS
A Type for Every Need—Large Diameter—Light Weight — Extra Strong — Seamless.
National Sherardizing & Machine Co.
Hartford, Conn. Akron, Ohio

TESTING MACHINES
RUBBER TENSILE TEST MACHINES
TEXTILE TESTING MACHINES
Write for Descriptive Literature
Henry L. Scott Co.
P. O. Box 963 Providence, R. I.

THE MARKET PLACE
is the acknowledged Buyers' Guide to products and services in the rubber industry.
Use it—for RESULTS!

Reclaimed Rubber . . . .

RECLAIMED RUBBER—
For All Purposes
NAUGATUCK CHEMICAL
Division of United States Rubber Co.
1230 Sixth Ave., N. Y. City

RECLAIMED RUBBER—
Uniformity, reliability, cleanliness
Pequanoc Rubber Co.
Butler, N. J.

RECLAIMED RUBBER—
A standardized grade for every requirement.
U. S. Rubber Reclaiming Co., Inc.
500 Fifth Ave., New York, N. Y.
"58 Years Serving the Industry Solely as Reclaimers"

The Progressive Concern Selling to Rubber Manufacturers Uses THE MARKET PLACE for Results

Rubber—Crude; Scrap; Latex; Dispersions

CREPE RUBBER
Specialists in Latex Crepe
Charles F. Connor & Co., Inc.
110 State St., Boston, Mass.
Telephone: LAFayette 3690

CRUDE RUBBER
LATEX, BALATA
GUTTA-PERCHA, GUTTA-SIAK
Robert Badenhop Corporation
Woolworth Bldg., New York City

CRUDE RUBBER
SCRAP RUBBER
Also HARD RUBBER DUST
H. Muehlstein & Co., Inc.,
122 E. 42nd St., New York City
BRANCHES: Akron, Chicago, Boston Detroit, Los Angeles, London, Paris

CRUDE RUBBER
SCRAP RUBBER
HARD RUBBER DUST
BALATA — GUTTA PERCHA
Hermann Weber Company
67 Broad St., New York

CRUDE RUBBER
LIQUID LATEX
Members of the Commodity Exchange, Inc., and Commodity Exchange Rubber Clearing Ass'n., Inc.
Charles T. Wilson Co., Inc.
120 Wall St. New York
AKRON OFFICE: 803 United Building

DISPERSITE
Water Dispersed Rubber
(Reclaimed—Crude—Synthetics)
Man-made Alternate for Latex
Dispersions Process, Inc.
1230 Sixth Ave., New York, N. Y.
Offices in Detroit, Boston, Indianapolis

GUAYULE "Duro" Brand and AMPAR Rubber, washed and dried ready for compounding.
High Grade PLANTATION RUBBER from our own Estates
Continental Rubber Co. of N. Y.
745 Fifth Avenue New York

LATEX
Normal, Concentrated, Processed
HEVEATEX CORPORATION
78 Goodyear Ave., Melrose, Mass.
Offices in New York, Akron, Chicago

LATEX
Normal and Concentrated
There is no better source for Latex
United States Rubber Co.
Naugatuck Chemical Div.
Rockefeller Center, New York, N. Y.

LOTOL
(Compounded Latex)
Ready to use
NAUGATUCK CHEMICAL
Division of United States Rubber Co.
Rockefeller Center, New York, N. Y.
Offices in Detroit, Boston, Indianapolis

REVERTEX
Highly Concentrated (About 75%)
Rubber Latex
Sole Distributor for U. S. A. and Canada
Revertex Corp. of America
37-08 Northern Blv'd., L. I. City, N. Y.

RUBBER
Crude Rubber
Liquid Latex
Ernest Jacoby & Co.
79 Milk St. Boston, Mass.
Cable Address: Jacobite Boston

RUBBER—
Scrap and Crude
Also HARD RUBBER DUST
A. Schulman, Inc.
Darrow Road, Akron, Ohio
1401 Mississippi Ave., E. St. Louis, Ill.
736 Statler Bldg., Boston, Mass.
Warehouses at Akron and E. St. Louis

VULTEX— THE ONLY VULCANIZED LATEX
Insures Highest Quality, Uniformity, Economy, Simplicity of Application.
FULLY PROTECTED BY PATENTS
Also Latex and Latex Compounds
General Latex & Chemical Corp.
Successors to the Vultex Chemical Company
666 Main St. Cambridge, Mass.

The Market Place

The WHERE-TO-BUY Section of THE RUBBER AGE in which are listed the Products and Services of the Leading Suppliers to the Rubber Industry. If what you are seeking is not listed here, write to the Service Department of THE RUBBER AGE, 250 West 57th St., New York, N. Y.

Rubber Mnfrs.

MECHANICAL MOLDED RUBBER GOODS
Sponge Rubber: Sheeted—Die Cut—Molded
Your Inquiries Solicited
Barr Rubber Products Co.
Sandusky, Ohio

SANITARY GOODS—
Dress Shields, Baby Pants, Aprons, Elastic Belts, Bloomers, Stopins, Bibs, Guimps and Brassieres.
SPECIAL GOODS CUT TO ORDER
Rand Rubber Co., Inc.
Summer Ave. & Halsey St., Brooklyn, N. Y.

SOFT MOLDED RUBBER GOODS
Made to Your Specifications
R. W. Rhoades Metaline Co., Inc.
30 West Ave., Long Island City, N. Y.

Consultants

CONSULTING LATEX TECHNOLOGIST
R. J. Noble, Ph.D.
21 Woodland Road, Malden, Mass.

CONSULTING
Rubber Technologist
R. R. Olin Laboratories
P. O. BOX 372, AKRON, OHIO
Telephones: Sherwood 3724, Franklin 8551

Do you believe in Your Products?
Then you should believe in telling the rubber industry about them. The MARKET PLACE is the logical place to display your wares.

Fabrics—Liners, Hollands

CUSTOM FINISHERS of
RUBBER REPELLENT LINERS
Capitol Process Liner Treatment
—
Textile Proofers, Inc.
One Gates Ave. Jersey City, N. J.

LINERS TREATED
Advantages of Porotex Treatment
1. All Compounds stripped easily. 2. Wrinkles never cause liners to crack. 3. Prevents rot; liners rendered heat and oil-proof. 4. Liners remain porous, reducing tendency to trap air.
POROTEX PRODUCTS
875 East 140th St. Cleveland, Ohio

PROCESSED LINERS
"CLIMCO"—Fabrics treated to prevent adhesion of rubber stocks.
"LINERETTE"—Treated paper for separating or interleaving light weight rubber stocks.
The Cleveland Liner & Mfg. Co.
5508 Maurice Ave., Cleveland, Ohio

WANT ADS—

RATES: Five cents per word, minimum charge, $2.00, except POSITIONS WANTED, $1.00 for 40 words or less, extra three cents per word. All classified advertisements payable in advance. Address replies to box numbers care of RUBBER AGE, 250 West 57th St., New York.

POSITIONS WANTED

CHEMIST—Four years' experience in general rubber compounding, development and research, and technical service to factory on manufacturing problems. Excellent scholastic record (B.S.) and references. Address Box 1174, RUBBER AGE.

SUPERINTENDENT—Fifteen years' practical experience producing rubber and synthetic molded and extruded goods. Thorough knowledge compounding, processing, cost, production, maintenance and personnel. Now holding responsible position but desire change. Available short notice. Address Box 1194, RUBBER AGE.

HELP WANTED

CHEMIST WANTED—Progressive rubber plant in east has an opening for an experienced chemist capable of assisting in general management of entire plant. Wonderful opportunity for right man. In replying state in full, background and desired salary. Address Box 1195, RUBBER AGE.

EXPERIENCED Balata or Gutta Percha refiner with experience in the refining of Resins and the recovery of solvents used, for responsible position in Defense work. State age, experience, and salary expected. Address Box 1191, RUBBER AGE.

EXPERIENCED RUBBER CHEMIST and technologist—Must have full and varied background in synthetic rubbers as Neoprene, Hycar, Thiokol, etc. both with dry rubber compounding and cement manufacture. Address Box 1196, RUBBER AGE.

EXPERIENCED RUBBER FOOTWEAR CHEMIST wanted for Canadian factory. State experience and salary expected. Address Box 1193, RUBBER AGE.

PLANT SUPERINTENDENT—Experienced on Molded Goods, Rolls, Compounds and Army and Navy specifications. Must know synthetic rubber of all types. Also Mold Designing. Address Box 1190, RUBBER AGE.

EQUIPMENT WANTED

EQUIPMENT in good operating condition, 2 Mills 42" to 60"; tuber suitable for treads from calenders. State full particulars and best price. Address Box 1184, RUBBER AGE.

WANTED: 1—Banbury Mixer; 2—Mills; 1—Calender; 5—Hydraulic Presses, with pump and accumulator; 2—Tubers. Address Box 1014, RUBBER AGE.

WANTED BY MANUFACTURER—Three hydraulic steam heated platen presses, 24" x 24" to 30" x 30", ram diameter 12" to 18". Give description, location and price in first letter. Address Box 1189, RUBBER AGE.

FOR SALE

FOR SALE: 1—Watson-Stillman, Hydro-Pneumatic Accumulator; 1—5 ft. dia. Vulcanizer, with quick opening door; 20—Semi-Automatic Hydraulic Presses; 1—Farrel-Birmingham 16" x 36" Rubber Mill, m.d.; 6—30" x 40", 1—38" x 78" Hydraulic Press; Hydraulic Pumps, Calenders, Tubers, etc. CONSOLIDATED PRODUCTS CO., INC., 14 Park Row, New York, N. Y.

FOR SALE: 1—Cut Farrel-Sykes D. H. Gear 15" Face 7.313" Bore; 1—Cut Farrel-Sykes D. H. Pinion 15" Face solid on shaft 4'2-7/8" long; 1—Meehanite Cut Spur Drive Gear 70.666" 106 teeth 1-1/2 D. P. 7" Face, 8.752" Bore, 72.000" O. D. #C-3296. Address Box 1192, RUBBER AGE.

USE THIS COLUMN
FOR
RESULTS

INDEX TO ADVERTISERS

Advance Solvents & Chemical Corp. —
Akron Equipment Co. 235
Akron Standard Mold Co. 235
Albert & Son, L. Outside Back Cover, 235
Aluminum Co. of America —
Aluminum Flake Co. 233
Aluminum Ore Co. —
American Cyanamid & Chemical Corp. 218, 233
American Firstoline Corp. —
American Zinc Sales Co. 234
Ames, B. C., Co. 235
Arkwright Finishing Co. —
Atlas Electric Devices Co. —

Badenhop Corp., Robert 176, 236
Baird Rubber & Trading Co., Inc. 219
J. T. Baker Chemical Co. —
Barr Rubber Products Co. 237, 238
Barrett Div., Allied Chemical & Dye Corp. 234
Beacon Co. 234, 238
Binney & Smith Co. Insert Following 210, 233, 234
Black Rock Mnfg. Co. 235
Brockton Cutting Die & Machine Co. 224, 235

Carter Bell Manufacturing Co., The 225, 234
Cleveland Liner & Mnfg. Co. 167, 237
Colonial Insulator Co. 235
Columbian Carbon Co. Insert Following 210, 233
Connor, Charles F., & Co., Inc. 236
Continental Carbon Co. 185, 233
Continental Machinery Co. 235
Continental Rubber Co. 236

Dispersions Process, Inc. 175, 236
Du Pont de Nemours & Co., E. I. Inside Front Cover, 234

Farrel-Birmingham Co., Inc. —

Gammeter, W. F., Co. 224, 235
General Atlas Carbon Div. 168, 234
General Latex & Chemical Corp. 236
Givaudan-Delawanna, Inc. 234

Hall Co., The C. P. 223, 234
Hamlin Machine Co. 235
Harmon Color Works, Inc. 225, 233
Heveatex Corporation 233, 236
Hoehler, Harry G. 233
Holliday, W. J., & Co. —
Huber, J. M., Inc. 233
Hycar Chemical Co. 219, 220, 224, 225, 227

International Pulp Co. 176, 233
Interstate Welding Service 174
Jacoby, Ernest, & Co. 233, 236

McKinnon Iron Works Co., The 235
Magnetic Pigment Co. 234
Marine Magnesium Products Corp. 234

Monsanto Chem. Co. (R. S. Dept.) 233
Moore & Munger 170, 233
Muehlstein & Co., H., Inc. 169, 236

National Carbon Company, Inc. 183
National Rosin Oil & Size Co. 176
National Sherardizing and Machine Co. 235, 236, 238
Naugatuck Chem. Div. U. S. Rubber Co. 188, 233, 236
Neville Co. 233
New Jersey Zinc Co. 186, 234
Noble, R. J. 237

Olin Laboratories, The R. R. 237

Pancorbo, M. 235
Pequanoc Rubber Co. 236
Pittsburgh Plate Glass Co., Columbia Chemical Div. 182, 233
Porotex Products 237
Proctor & Schwartz, Inc. 235

Rand Rubber Co. 237
Randall, Frank E. 235
Rare Metal Products Co. 224, 233
Revertex Corp. of America Insert Following 164, 236
Rhoades, R. W., Metaline Co., Inc. 237
Ross & Son, Charles 235
Royle & Sons, John 177, 235

St. Joseph Lead Co. 234
Schulman, A., Inc. Inside Back Cover, 236
Scott Co., Henry L. 225, 236
Skelly Oil Co. 178
Southeastern Clay Co. 176, 234
Stamford Rubber Supply Co. 176, 234
Stanco Distributors, Inc. 181
Standard Chemical Co. 180
Stauffer Chemical Co. 182, 234
Stearns Magnetic Mfg. Co. 235
Sun Oil Co. 234

Textile Proofers, Inc. 184, 237
Thiokol Corporation —
Titanium Pigment Corp. 179, 234
Trade News Service —

Union Carbide and Carbon Corporation 183
United Carbon Co. Insert Following 220, 233
United Shoe Machinery Corp. 235
U. S. Rubber Co., Naugatuck Chemical Div. 188, 233, 236
U. S. Rubber Reclaiming Co. 236
Utility Mfg. Co. 235

Vanderbilt, R. T., Co. Front Cover, 233

Weber, Hermann, Co. 236
Whittaker, Clark & Daniels, Inc. 184, 235
Williams, C. K., & Co. 176, 234
Wilson Co., C. T. 236
Wishnick-Tumpeer, Inc. 173, 233

Zophar Mills, Inc. 224

BEACON MONTEN WAX

Accepted in the Industry as the No. 1 replacement for Montan Wax

Have you had a sample?

THE BEACON COMPANY

89 Bickford St. Boston, Mass.

Your Logical Source of Supply for Zinc Stearate

12 Issues a Year

$2.00 Annual Subscription

THE RUBBER AGE

AIR BAG BUFFING MACHINERY

STOCK SHELLS HOSE POLES

MANDRELS

NATIONAL SHERARDIZING & MACHINE CO.

868 Windsor St. Hartford, Conn

Representatives: Akron San Francisco New York

MECHANICAL

MOLDED RUBBER GOODS

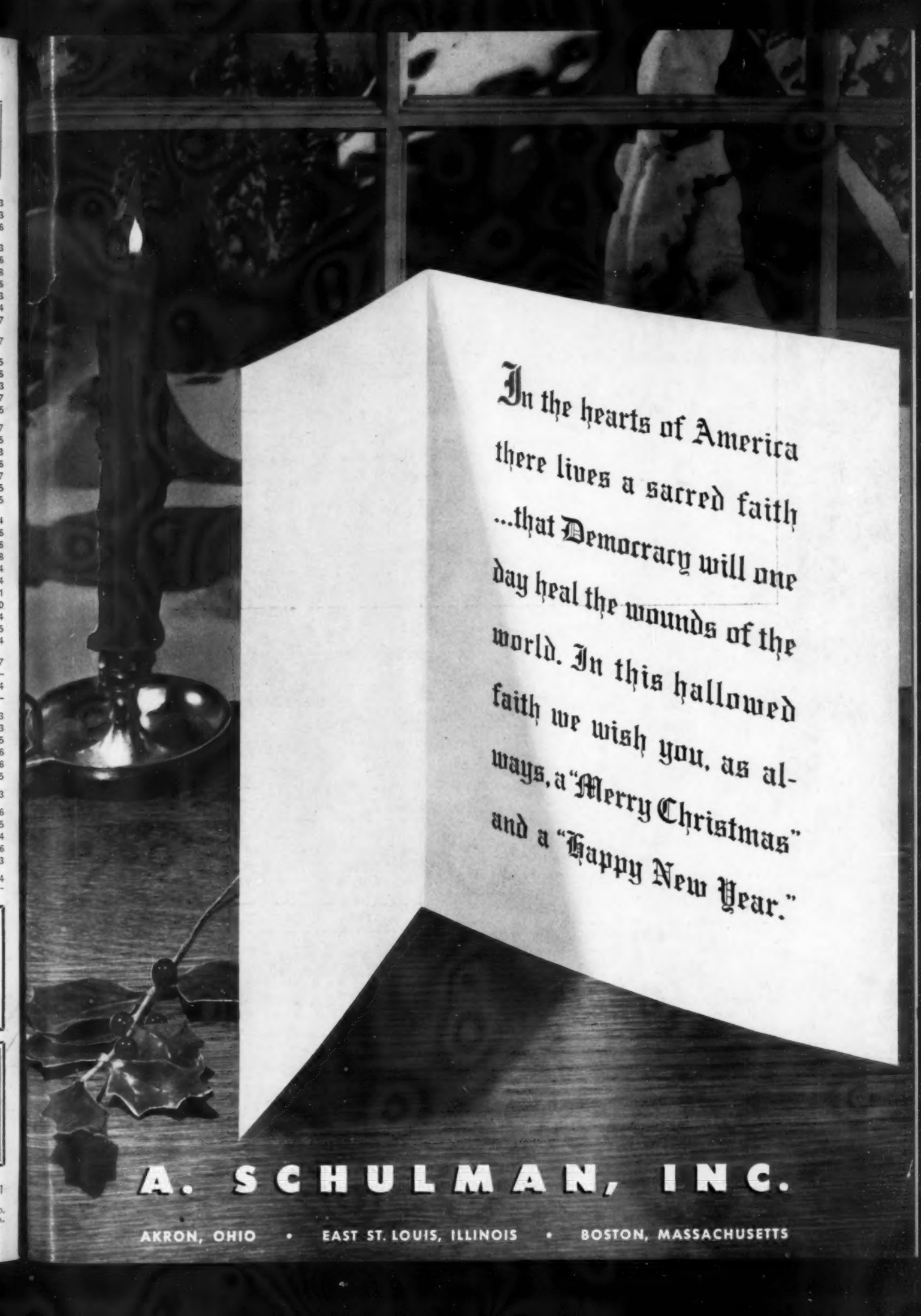
Sponge Rubber: Sheeted—Die Cut—Molded

We Solicit Your Inquiries

THE BARR RUBBER PRODUCTS COMPANY

SANDUSKY, OHIO

HUGHES PRINTING CO.
EAST STROUDSBURG, PA.


In the hearts of America
there lives a sacred faith
...that Democracy will one
day heal the wounds of the
world. In this hallowed
faith we wish you, as al-
ways, a "Merry Christmas"
and a "Happy New Year."

A. SCHULMAN, INC.

AKRON, OHIO • EAST ST. LOUIS, ILLINOIS • BOSTON, MASSACHUSETTS

YOUR ENCYCLOPEDIA

of Rubber and Plastic Machinery is ready

WE USED to call it a catalog . . . our illustrated and documented list of rubber and plastic machinery, new and reconditioned, produced in the four plants of L. Albert and Son. We sent out individual booklets on various types of equipment . . . booklets which could be bound together in looseleaf form.

But one day a customer called us and said, "Say, will you send me one of your encyclopedias? A fellow borrowed mine for the compounding tables and didn't bring it back!"

Well, we'd never thought of it as an encyclopedia. But after all, our catalog had grown (in 50 years of ever-expanding service to the rubber and plastic industries) into just that . . . a compendium of useful information on rubber and plastic machinery, on compounding, on mathematical tables and other important data. It grew because we've tried, year after year, to make it increasingly useful to the trade.

So, rather proudly, we're announcing that our 1942 "Encyclopedia" is ready . . . 150 pages of illustrated, documented information about machinery you may need in your business, and complete information on its use.

For your copy, write to the L. Albert & Son Office nearest you.

L. ALBERT & SON

MAIN OFFICE AND PLANT TRENTON, N. J.

BRANCH OFFICES AND PLANTS: AKRON, OHIO • LOS ANGELES, CALIF. • STOUGHTON, MASS.

50 YEARS

Albert